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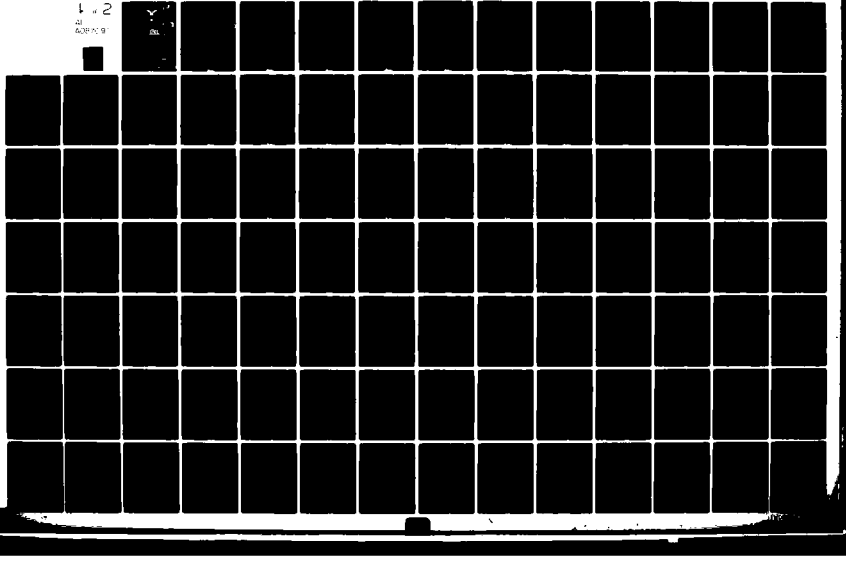

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AN ASSESSMENT OF CURRENT METHODOLOGIES USED TO EVALUATE FOREIGN MILITARY SALES PAYMENT SCHEDULE EFFECTIVENESS

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LSSR 24-80

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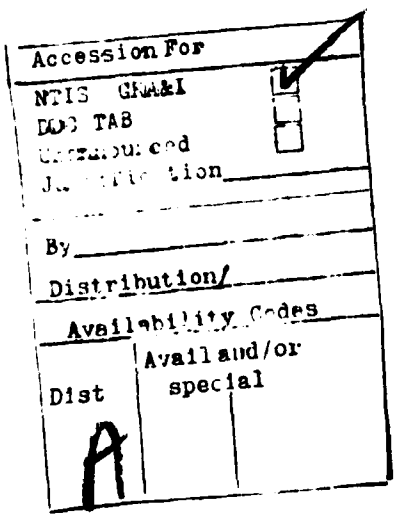

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The sale of military hardware, related equipment, and services to other nations has become, in recent times, an important political tool in international relations and an important source of revenue for the United States. This thesis effort is designed to examine the alleged problems associated with a determination of the effectiveness of the USAF FMS payment schedule with respect to its capability to predict FMS billing statements. Three methods are identified and evaluated as indicators of effectiveness. The results did not indicate that the methods were satisfactory but did find problems within the FMS financial management area in the structure of data for comparison. Recommendations for improvements are made.

LSSR 24-80

AN ASSESSMENT OF CURRENT METHODOLOGIES USED TO EVALUATE FOREIGN MILITARY SALES PAYMENT SCHEDULE EFFECTIVENESS

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

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COMMITTEE CHAIRMAN

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TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

INTRODUCTION

The sale of military hardware, related equipment and services to other nations has become, in recent times, an important political tool in international relations and an important source of revenue for the United States. This chapter provides an introduction to the importance of Foreign Military Sales (FMS) and describes in some detail the magnitude and complexity of FMS in the world today.

Because of its potential impact on international relations, national security and the economy, FMS has become a major topic of concern for both the President and the U.S. Congress.

> Considering its broad scope and bearing on the economic well being and security of the U.S. [United States], its friends, and allies, it is especially important at this time in our history that the FMS [Foreign Military Sales] program be allowed to find its constituency equilibrium level while being effectively controlled by the Department of State and efficiently managed by the Department of Defense [DOD]. For if we lose such a program through the inability to adjust politically, apply effective policy, or manage operations, we would surely abrogate an important world leadership responsibility [8:1].

For an understanding of the importance of FMS to the United States, it should first be noted that the international arms trade can be conveniently divided into three groups. The arms trade can be

gifts or grants of military aid, it can be transfers between governments of military equipment, etc., or it can be the international trade from commercial sources directly to foreign governments (8:7). All of these methods together make up the international arms trade which has become big business for the United States and other countries. Though the main thrust of this research is in the area of government to government sales and not grants or commercial sales, the following background information should serve to lend perspective to the magnitude and complexity of the subject.

Background of Foreign Military Sales

After World War II the United States, through the Marshall Plan and the Truman Doctrine, helped the war torn countries rebuild themselves. This aid, called Grant Aid, and other gifts totaled over 30 billion dollars through 1964 (9:3). As these countries became more and more self-sufficient the United States was able to enter an era of trade instead of aid. Total dollars resulting from military sales were initially less than the amount involved in military grant aid programs but they gradually increased to the point that between the years 1950 to 1976, sales alone amounted to $56.9 billion (8:1).

By 1964 the total dollar amounts of grant aid and FMS were approximately equal with values of approximately $1 billion each (9:4). As grant aid programs gradually decreased in significance, the FMS

program continued to grow. The Foreign Military Sales Act was passed by Congress in 1968 in recognition of this shift in policy and associated procedures. This act consolidated the general administrative mechanisms and legislative authority which were necessary to meet the needs of a growing FMS program. It also defined the purpose of FMS as an instrument of foreign policy (11:1).

The total dollar value of foreign military sales continued to grow and by 1974 had exceeded ten billion dollars (4). In 1977 the total value of foreign military sales was $11.2 billion and the 1978 total was 13.5 billion (15:1). These sales' totals are astounding in their magnitude but must be viewed in the proper perspective. The 1960's and 1970's can be characterized, in the business context, as being a period of rapid development of multinational corporations and of realization of the potential market which existed in other countries for goods and services produced in this country. In many respects the exponential growth of military sales around the world is due to commercial enterprise, and not to a desire on the part of the U.S. Government to become a merchant of arms.

While the figures show that the dollar values of foreign military sales have been increasing at an increasing rate, the figures do not in themselves adequately reflect the increasing complexity of the individual sales. Today, foreign military sales impact on almost all levels of the federal government and consist of agreements to sell

sophisticated equipment and provide delivery of complete inventories of support items for many years after the sale. Additionally, heightened sensitivities caused by international political considerations have also had an impact on the complexity of modern foreign military sales. For example the sale of military hardware or technology to almost any country will have an effect on the relations with other countries in the same area. Since the United States first declared that FMS is an instrument of foreign policy, the management of foreign military sales has become increasingly complex. This has been due, in part, to the additional legislation and administrative regulation that resulted from the attention given this subject by Congress. In 1976 Congress passed the International Security Assistance Arms Export Control Act which gave it more control over foreign military sales by stating that sales of defense inventory items valued over $7 million or sales of production equipment and military services valued at over $25 million must be submitted to Congress for its approval (12). This requirement to obtain the approval of Congress provides for more Congressional oversight of the FMS process, but at the same time, it also adds another dimension of complexity to an already complex subject.

Financial Management

To this point the FMS facts and figures have outlined a

dynamic subject whose increasing size and complexity have caused much concern to the Department of Defense (DOD), Department of State, and the Congress. Much critical attention has been placed on this subject in the past and will be required in the future. Among the many separate parts of FMS management which have not received sufficient critical attention are three methods currently used to measure the effectiveness of the FMS payment schedule with respect to its ability to predict quarterly amounts payable.

The FMS payment schedule is generated to give the foreign government a basis for budgeting their quarterly expenditures throughout the course of the contract. Since most countries have budgetary limitations, it is in their best interest to use their money in the most efficient manner. If they fail to budget sufficient funds, then delivery of the FMS item can be delayed and an interest penalty can be assessed. If the payment schedule recommends budgeting excessive dollars for a particular FMS case, then funds are unnecessarily prevented from being applied to the country's other programs. Few countries in the world have unlimited treasuries.

An FMS payment schedule is also important to the United States, since it is this payment estimate which is the prediction of costs which must be recovered during future time periods. Therefore should the payment schedule reflect an inaccurate estimate of the expected expenditures then not only will the foreign customer be

unable to use its money efficiently, but the U.S. Government may find it difficult to recover the costs of the sale.

While important to both the foreign customer and the U.S. Government, confusion exists with regard to the payment schedules provided by the services. Absence of documented investigation into methods to evaluate the effectiveness of payment schedules has been a major source of this confusion. This thesis effort is designed to examine the alleged problems associated with USAF FMS activities exclusively.

Problem Statement

Documented research has not been performed to test the validity of current methodologies used to measure the effectiveness of the FMS payment schedule as a predictor of the FMS Billing Statement.

Research Objectives

Our purpose, then, required that we orient our efforts toward certain objectives. These objectives were:

1. To provide an understanding of FMS key financial management documents.

2. To present those relationships which must exist to ensure valid and meaningful comparisons between the payment schedule and

the corresponding billing statement.

3. To test the validity of three selected methodologies in the above mentioned problem.

4. To identify actions and make recommendations, if necessary, for improving the evaluation of the effectiveness of the FMS payment schedule based upon evidence gathered by this research.

Research Questions

To achieve the objectives we established the following research questions:

1. What conclusions can be drawn with respect to the validity of three selected methodologies used to test the effectiveness of the FMS payment schedule?

2. Is the correlation or lack thereof between results obtained from each of the methodologies meaningful?

3. What differences between payment schedule generation and bill preparation methods prevent direct, one to one comparisons?

4. Is it possible to isolate the causes of the disparity or remove their effect to permit a valid evaluation of payment schedule effectiveness?

Thesis Organization and Format

This chapter has provided essential background information

so that the reader may appreciate the magnitude of foreign military sales in the world today. Other statistics could be cited but none are more indicative of the size of the subject than the following estimate. If new sales were to cease immediately, the U.S. Air Force would still have to support previously sold weapon systems for the next twenty years (8:105). The importance of foreign military sales to the United States' international relations, national security, and national economy cannot be overemphasized.

Chapter 2 discusses the legislation and regulation which has shaped current definitions on the prices to charge and the costs to recover when processing foreign military sales. Moreover, the development of the FMS payment schedule is detailed to include its relationship to the FMS Billing Statement. Throughout Chapter 2, appropriate references are made to various documents which have been instrumental in the development of the current payment schedule methodology, or which provide insight into this evolutionary process.

Chapter 3 contains the description of three methodologies which have been selected to use in testing the FMS payment schedules' ability to predict quarterly amounts due and payable. The plan for obtaining data in the tests is also described in that chapter.

Chapter 4 is an analytical evaluation of the results obtained from applying each of the three test methodologies to the same data. The reader will begin to see the evidence increase for the assertion

made in Chapter 1's statement of the problem, and strong support will be developed for the conclusion and recommendations that follow.

Chapter 5 contains the conclusions drawn from the analysis of the data and from the research. The initial research questions are addressed and answered. Additionally conclusions outside the scope of this research but relating to FMS financial management are discussed.

Chapter 6 consists of the authors' recommendations as a result of the research. Through these recommendations, the objectives of this effort will be met.

The next chapter, then, presents an in-depth narrative and description of the payment schedule, its subsets, and its relationship to the FMS Billing Statement.

Chapter 2

FOREIGN MILITARY SALES FINANCIAL MANAGEMENT

Introduction

The magnitude of dollars involved in the sale of military equipment and services and the complexity of managing the FMS accounts that the United States has with foreign accounts are genuine concerns of the Department of Defense, the Department of State, and the Congress. These agencies and elected officials are aware that problems exist in the area of FMS. A problem which has received little critical attention until this thesis effort, however, is FMS payment schedule effectiveness. This chapter will help the reader understand the evolution of definitions and those considerations which have influenced FMS financial management up to the present.

FMS Financial Management Development

The Letter of Offer and Acceptance (LOA), DD Form 1513, is the form used by all Defense Department agencies for all military sales of equipment, services, or training (13:D1). The form is used to list those items of equipment and services which have been offered

for sale by the United States. A sample DD Form 1513 is provided in Appendix A. When the offer is accepted and appropriate funds are transferred, the contract is completed. The LOA, when signed is an official and legal agreement between the United States and the foreign customer. Due to its contractual nature, the LOA must contain sufficient information to accurately explain the responsibilities of both parties involved in the transaction.

Costs that are listed on the LOA are generally estimates based upon contractor's quotes, standard prices, or recent sales of similar articles. The payment schedule that is included with the LOA is also an estimate. Though based on as much accurate information as possible, they both may be in error. If the estimated cost or the payment schedule is significantly different from the actual cost, the United States will use its best efforts to notify the country customer of the discrepancy (14:A6-2). This notification is accomplished by using a Modification to the Letter of Offer and Acceptance, DD Form 1513-2. Other changes may be made by a DD Form 1513-1, and are not the subject of this research.

The financial annex of the DD Form 1513 (and DD Form 1513-2, if applicable) contains the payment schedule which is displayed in three columns. One column has the quarter's date for which the payment schedule is estimating the bill. The next column displays the amount estimated to be the bill for that quarter, and the

last column indicates what the cumulative amount should be from the initial deposit to that date. The costs that are included in the calculation of the payment schedule are not included by accident. It is in the best interest of the U.S. Government to create an accurate FMS payment schedule, since the U.S. Government should recover all costs associated with FMS cases (11:1542). In September 1978 the General Accounting Office (GAO) wrote:

> Over the past decade, considerable effort has been devoted to improving the adequacy of Foreign Military Sales cost recoupment. This effort has led to improved pricing policies and better recoupment from foreign governments. However more effort is needed to recover all costs [20:Cover].

The effort to recover all costs associated with FMS cases is not just the result of administrative concern and attention in this area. With the enactment of the International Security Assistance and Arms Export Control Act of 1976, as amended, the Congress clarified and strengthened cost recovery requirements of foreign military sales as a matter of law (20:6). Since the payment schedule indicates to the foreign government the estimated amount their budgeting process will be required to deposit in the trust fund,* this directly impacts on the U.S. Government's ability to have sufficient funds on hand to recover all costs.

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*NOTE: "The FMS trust fund contains advance payments from foreign governments as required by the Arms Export Control Act as amended [15:2]." Maintained by the U.S. Treasury, amounts from this fund are apportioned to the DOD agency responsible for financial accounting.

The GAO has, over the years, written at least thirty other reports to the Congress on the subject of FMS pricing, cost accounting, and trust fund management, resulting in new definitions of the costs which should be recovered in a foreign military sale. These GAO findings are also relevant to the subject of FMS payment schedule effectiveness to the extent that they describe the categories of costs and methods of accounting that were later included in the various DOD instructions on the pricing of defense articles in foreign military sales. For example, "the U.S. Government is to charge no less than the value of materials and services sold [11:1542]." The International Security Assistance and Arms Export Control Act, as amended (Public Law 94-329), provides that Letters of Offer, "will include appropriate charges . . . to recover the full estimated administrative costs of the sales from purchasers [19:12]."

In implementing another feature of the International Security Assistance and Arms Export Control Act, the DOD included three provisions in the standard sales contract (DD Form 1513):

1. The price charged for items will be their total cost to the U.S. Government.

2. The U.S. Government will notify the foreign customer if price increases will change the contract price by more than 10 percent.

3. The foreign customer will pay the full final price, even

if it is more than the estimated price (18:3).

A recent change to the Military Assistance Sales Manual (DOD 5105.38-M) has gone even farther toward ensuring that the U.S. Government is able to recover all costs. On 30 Aug 1979, the Defense Security Assistance Agency (DSAA) directed that certain steps be taken to protect the U.S. Government from pecuniary liability resulting from early termination of an FMS contract.

> Department of Defense components implementing Foreign Military Sales agreements are responsible for the determination of termination costs and for ensuring that this amount is collected and held in reserve [3:1].

> Termination liability reserve is that amount collected from a purchaser and held in escrow in anticipation of any liability that would accrue to the U.S. Government should a particular case or program be terminated prior to the normal completion of the contract. The reserve is not always a constant amount but must be adjusted regularly as contracts are awarded, work progresses, payments are received, and deliveries made [3:1].

This latest development of contract termination liability reserves is a reaction to two recent events. First, the large scale cancellation of contracts between Iran and the United States, and second the request by Saudia Arabia to remove its large deposit from the FMS Trust Fund, which does not pay interest, to a commercial interest paying institution (2:1). The GAO report in July of 1979 stated that:

> The extent of the United States' liability, should Iran not pay its debts has not been the subject of litigation and remains to be resolved in the courts. However, based upon the contractual

> relationship between the United States and the defense contractors, it would appear that a court may well hold the United States liable to the contractors for their unpaid work [16:2].

These events and the previously mentioned guidance have all had an impact on the kinds of costs that are included in the payment schedule. They have additionally had the effect of elevating the importance of the payment schedule since it has become so closely tied to the United States' ability to recover all costs associated with any particular FMS case. With this in mind, the following information will help the reader understand the preparation of the FMS payment schedule.

The FMS Payment Schedule

The generation of a payment schedule is basically an accurate manipulation of dollar amounts in certain relationships to a time schedule. Once the relationships have been described and the amounts to be included are defined, then the actual task of preparing the payment schedule is best left to a computer.

"Foreign Military Sales Payment Scheduling Program (FMSPS)" is the title of a document prepared by Mr. W. A. Oxandale for the Directorate for International Logistics, United States Army (AVSCOM). Mr. Oxandale's work detailed the development of and instructions for use of the United States Army's computerized program for estimating FMS payments (10:1). Parallel development of

a similar management procedure in a sister service yields valuable perspective on the subject since many of the reasons that drove the United States Army to develop its computerized FMS payment schedule program are similar to those considerations which resulted in the U.S. Air Force's computerized program for estimating FMS costs.

The United States Army's method attempts to incorporate an exponential component to describe the cost incurred profile of the contractor to more nearly predict the obligation expected at any time during the life of the contract. The U.S. Air Force's model also attempts to predict the expected obligation at any point during the life of the contract. The U.S. Air Force's methodology for computing the FMS payment schedule includes, not only the costs expected to be incurred by the contractor, but also costs expected to be incurred by the U.S. Air Force and such other estimated amounts as progress payments, packaging and shipping, contract termination liability costs; all of which are tied directly to the time schedule of the FMS case. Not only are the amounts for these additional fees defined to be certain percentages of the price for the goods and services sold, but the amount also varies quarter by quarter so that ideally, the foreign customer is only being charged for the proper proportion of the FMS case completed up to that time. Likewise, the U.S. Government is assured that it will be recovering all costs associated with the case to that date. To the degree that the program's mathematical

algorithm adequately describes contractor costs per time, and that no extreme changes occur in real time, then the model can approximate or model reality. Note here that not all FMS cases exclusively involve procurement items. Most cases involve a certain percentage of stock items and the payment schedule should be based upon the appropriate lead time for this type of item also.

Intuitively the reader may have concluded that transfers from the U.S. Government to other foreign nations of goods and services worth billions of dollars every year, would necessitate repetitive, manhour-intensive, accounting and billing procedures. This conclusion is correct, and the calculation by hand of the increasing quantity of complex payment schedules is therefore no longer feasible.

> From the standpoint of the volume and complexity of the work, and from the standpoint of consistent accuracy of calculations, the automation of the payment scheduling procedure was clearly indicated [10:1].

The U.S. Air Force's methodology for generating FMS payment schedules is embodied in its computer program called LD29A/MOD 2. The program allows for various kinds of FMS cases, produces an output with easily understood plain English column headings, and calculates and prints the FMS payment schedule faster than unassisted human operators. While it is not meaningful to compute the exact speed of the computer due to the wide variation in FMS case types and human skills, the United States Army reportedly experienced a 98% decrease in average processing time when their FMS

payment schedules were generated by computer rather than by hand (10:8). The U.S. Air Force can legitimately expect the same significant reduction in manhours for processing U.S. Air Force FMS payment schedules.

The FMS payment schedule is inherently a predictive tool employing a mathematical algorithm to model real world obligation and cost accumulation. As the contractor begins to perform the work or supply items begin to be requisitioned for shipment to the foreign country customer, costs begin to accumulate. However, the entire program cost is not incurred on the first day and neither is all the cost incurred on the last day. As indicated earlier, DOD is required to recover all costs which may be incurred while processing a foreign military sale.

It is desirable that the portion of the total program cost which will have been obligated at any point in time, be predictable. Both the U.S. Government with its requirement to recover all costs, and the foreign customer have a demonstrated need to be able to predict the expected cumulative costs of any FMS program at any point in time.

The relationship of time to the estimation of FMS quarterly amounts payable is capable of being modeled in many ways. Other services have experimented with Cost Performance Reporting, straight line percentages, and pure subjective estimates. The U.S.

Air Force attempts to capture the timing of costs accumulated by contractors in a manufacturing and production process, based upon historical data from recent years' sales of F-5's (6). Though certainly there are FMS cases other than F-5's, these sales involved most aspects of travel, support, training, etc., so that they were assumed by the developers of the current payment schedule methodology to adequately reflect most types of cases. The very legitimate concern in this area is that the production process model based on F-5 production experience, may not be valid for procurement sales in the 1980's. Lead time changes, or materiel shortages may have drasticly changed the timing of cost accumulations. If lead times increase and the payment schedule model does not account for this, then the foreign customer and the U.S. Government will expect costs to accumulate more quickly than is realistic. This lead time problem is no where more evident than in the difference in time between payment schedule generation and FMS Billing Statement preparation. In fact during the past two years, the definitions of costs which must be recovered have changed several times. It is important to note that while these changes were being made, older FMS cases were still being processed. This compounds and intensifies the complexity of FMS accounting and managing procedures. Often times there is a two to three year delay between requests for information by a foreign government concerning a possible purchase, and the date of the first

delivery. The effect on implementing agencies of changes made in the interim is certain to be one of increased complexity.

Legislation and contract provisions

> . . . protect the U.S. Government from absorbing a loss on a Foreign Military Sale, but do not prevent embarrassment to the U.S. Government when prices charged exceed the original prices quoted, or when the actual delivery date is longer than quoted [7:46].

This is an interesting perspective and inducement for minimizing the variance between payment schedules and quarterly bills. It is important to note however, that the payment schedule estimation depends upon the correct identification of the proper costs to be charged early in the LOA process, and does not itself identify those costs.

Thus far consideration has been given to the historical development of the payment schedule, the types of costs which are included, and the relationship of the total case value to the timing of accumulating costs. Several references have necessarily been made to the FMS Billing Statement which contains the amount due that the payment schedule attempts to predict. A more complete discussion of the billing statement follows in the next section.

The FMS Billing Statement

Before beginning the discussion of the actual FMS Billing Statement, it is necessary to point out an important distinction which

exists between the agencies involved in managing foreign military sales. Generally the implementation of contracts between the United States and the foreign customer is managed by the individual military services such as Army, Navy, or Air Force.

Prior to fiscal year 1977, the individual services were also performing the function of billing the foreign customers for payment. Often a country would have contracts with more than one service at the same time, thereby increasing the number of separate billing statements which were sent to the customer, and increasing the complexity of the FMS financial system. Different methods of financing, different cost definitions and different forms of documentation all acted in concert to create a situation which mandated better control. In 1979 the DOD managed FMS agreements valued at over $70 billion and the accounting and management for this directly involved more than forty DOD organizations (15:2).

It was in this atmosphere of increasing size and complexity of foreign military sales that over thirty GAO reports were written detailing the serious money-management problems being experienced by the DOD. The following examples are indicative of the magnitude of difficulty being experienced:

1. The U.S. Army's Foreign Military Sales accounting breakdown contributed to a $225 million violation of the Anti-Deficiency Act (15:3).

2. The U.S. Navy was unable to reconcile $554 million in differences between foreign governments' cash balances on Navy records and balances shown in the trust fund (15:3).

3. Air Force stock fund items sold to foreign customers may have been under priced by $32.5 million (17:7).

The result of the attention brought to bear on the subject of foreign military sales was the creation of the Security Assistance Accounting Center (SAAC) in November 1976. This agency is a management attempt to centralize FMS billing and collecting operations. While the USAF is the executive agent, SAAC is a DOD level agency which has been assigned the mission of providing information on the status of accounts and FMS trust fund balances to the foreign customers. The average daily balance in the trust fund is $6 billion and each year between $8 and $9 billion dollars are deposited and disbursed (15:2).

Even though the responsibility for billing and collecting has been centralized at SAAC,

> The individual military services are still responsible for . . . detailed obligation, expenditure, and cost accounting; for paying contractors; and for reporting these disbursements, as well as other financial data, to the Center [Security Assistance Accounting Center] [15:2].

There are problems associated with a centralized billing and collection system which must operate in concert with decentralized pricing and delivery system. Each military service has its own

unique system to account for its FMS activities, and to report this information to SAAC (15:2).

A recent and potentially important assessment of the current centralized billing and collecting operations focused on the delivery reporting aspect of information being used by SAAC to calculate the billing statements. Generally the document's conclusions indicated that much of the information which is being used by SAAC to prepare FMS billing statements for U.S. Air Force customers is arriving at the center too late to be included in the correct quarter's statement. Sometimes this causes a delay in the preparation of the statement, and other times the statement is sent to the customer without complete information. One cause for this delay was found to be poor communication between Air Force major commands.

> Untimely delivery reporting for certain Air Force Foreign Military Sales procurements involving transfer of documentation between AFSC and AFLC subordinate organizations has occurred. Clear responsibilities must be assigned for FMS delivery reporting for contractor procurements initiated between AFSC and AFLC [1:Sec.III,68].

SAAC receives information from the military services and other FMS case implementing agencies such as the Defense Logistics Agency, the Defense Mapping Agency and others, on the value of deliveries that have been made to date for a particular FMS case. As mentioned previously, this information may be delayed. The document which contains this information is the RCS:HAF-ACF(M) 7128 Report. All

U.S. Air Force commands which implement foreign military sales are responsible for submitting this report (14:5-2).

With this background on the centralization of the billing and collection function at the DOD level, and the operational management of the individual FMS case at the military services level, the key document worth briefly identifying is the actual FMS Billing Statement, DD Form 645. This form is directed for use by SAAC as the billing statement in DODI 2140.3 and a sample DD Form 645 is included in Appendix B. It is the billing statement which the FMS payment schedule allegedly attempts to predict. The DD Form 645 is calculated from information supplied by the military services and trust fund balance information. A working description of the form is provided for U.S. Air Force case managers in AFR 400-3, and presents information to the customer relevant to the computation of the bill for goods and services sold through foreign military sales. The DD Form 645 is prepared and sent to the customer on a quarterly basis, and contains information about payments due in the current quarter. This amount due is the sum of costs which accrued since the previous bill, and an estimated amount for cost which will accrue during the current quarter.

There is no separately identified accounting of contract termination liability on the DD Form 645, though the amount for this purpose is collected under another name. AFR 400-3 says that the

progress payment amount which is billed to the customer, should be the amount for which the contractor on a procurement case has billed the U.S. Air Force (14:A37-2). The amount calculated by SAAC for progress payments on the DD Form 645 contains not only the appropriate amount (according to AFR 400-3) for progress payments, but it also contains an amount for contract termination liability (21).

Since the DD Form 645 receives inputs from many sources, the quarterly statement of payment due may not match exactly the FMS payment schedule. Some possible reasons for these differences will be discussed in a later section. Having identified the two basic documents which are used in FMS financial management, the focus of attention shifts to a management document which attempts to measure the effectiveness of the FMS payment schedule.

FMS Payment Schedule Effectiveness Report

As indicated in the first chapter, the major interest of this thesis lies in the area of evaluating the capability of the payment schedule to predict the amount due as calculated on the DD Form 645. A management information report exists which attempts to do just that, and is titled the FMS Payment Schedule Effectiveness Report. This report is generated by SAAC on a quarterly basis and was developed before much of the current guidance on total cost recovery

for FMS was written. A sample of this report is provided in Appendix C. The Payment Schedule Effectiveness Report seems to have the most potential to provide a direct assessment of the capability of the payment schedule to predict quarterly amounts due. However, this report has fallen into widespread disrepute and the information contained in the report, though factual, is no longer computed according to the revised definitions of costs which must be recovered (6;21). This relationship between the billing statement and the payment schedule is our specific area of comparison.

Summary

The U.S. Government has economic relations with many foreign nations. In this chapter, the critical factors which are central to the generation of payment schedules, the preparation of quarterly FMS Billing Statements, and the calculation of Payment Schedule Effectiveness Reports have been shown to be interrelated, complex and involving large amounts of capital assets. None of these documents can be analyzed completely without formally acknowledging the impact that each has on the other. Complexity and change are proper hallmarks of the environment in which these documents are evolving. As stated previously, the definitions have changed so that today as this report is being written, DOD is managing FMS contracts less than two years old which were signed when definitions of costs,

preferred methods of financing and the general economic condition of the country were all different. This research effort is the first documented study of these FMS financial management documents, their computational validity and their relationships to each other.

The next chapter explains three methodologies used in the FMS environment to evaluate the effectiveness of the FMS payment schedule. Each method makes use of the information presented on one or another of the three documents just described; the payment schedule, billing statement, or payment schedule effectiveness report. The data collection plan is also contained in the next chapter, and it will detail the kinds of data which were selected and the method for applying the data to the three tests of payment schedule effectiveness.

Chapter 3

METHODOLOGY

Introduction

Chapter 1 has shown the FMS process to be very involved, providing numerous possible areas for research. Chapter 2 discussed the financial aspect of foreign military sales. The fact that the GAO has written over thirty separate reports dealing with the financial management of foreign military sales is evidence of the widespread concern.

The avenue chosen in this research sheds light on one very important financial aspect involving the payment schedule and whether or not the capability exists to determine if that payment schedule is performing its primary function as a budgetary planning document. The actual computer program, LD29A/MOD 2, was obtained and included in this effort since it is the method of payment schedule generation. Three methods were then chosen as possible alternatives to evaluate this payment schedule. Although not the only methods available, these three encompass the problem areas involved in such a comparison. The first section discusses the need for the user's guide and the computer program. The next three sections show the

actual methods involved in this effort and the logic for using each particular method. The final section is the data collection plan which includes the rationale and criteria used to select the cases to be evaluated. Those organizations which supplied the data used herein are detailed in the data collection plan.

The Computer Program

The computer program used to generate the payment schedule was obtained in order that the payment schedule generation process could be completely understood. With the program itself and the user's guide it was possible to ascertain the components of the payment schedule. This was necessary to insure that the program itself was capable of handling all required costs, and delivery rates. After insuring that the computer program was in fact considering all the requirements set forth in Chapter 2 such as specific costs, charges, and contract termination liability reserve, an examination of the three methodologies was possible.

Method #1

The first of the three methods used the quarterly estimate as stated on the payment schedule and the remittance amount stated in column 14 on the corresponding DD Form 645. A sample payment schedule and DD Form 645 are shown in Appendix A and B,

respectively. The date the payment is due is shown in block 2 of the DD Form 645. The corresponding quarterly estimate can be read from the payment schedule. Table 4.1 on page 40 shows the requisite data which has been extracted from the payment schedule and billing statement and also resultant values obtained from the first method of evaluating the payment schedule's effectiveness.

For each quarter of each case, the amount due was subtracted from the corresponding payment schedule estimate. The absolute value of the result was divided by the amount due to obtain the percent difference between the payment schedule and the amount due.

This method would be used by the foreign customer in the same manner as an individual would expect his estimates of his monthly bills to approximate the actual bills. However, not expecting an actual bill to be equal to its estimate, one would expect the two to be at least within certain limits. When the percent difference was outside the limits, an explanation for the discrepancy was sought. However, the possibility of confounding factors, in effect, cancelling each other out was also present, therefore each case selected was examined in search of confounding factors, whether or not the payment schedule predicted the actual bill. The variance used in this effort was ten percent. That is, the payment schedule was considered to have successfully predicted the actual bill if the payment

schedule was within ten percent of the actual bill. This variance was chosen in the absence of any guidance in DOD Directives concerning an acceptable quarterly variance of the FMS payment schedule. The criteria selected here, however, was in accordance with other DOD financial management procedures that require the regeneration of a complete payment schedule should the total DD Form 1513 value change by more than ten percent (14:A6-2). In view of the lack of decision parameters for determining if the payment schedule was satisfactorily modeling the FMS billing system, the authors gave the present system the benefit of the doubt and selected fifty percent as the action limit. If, in only half of the samples, the payment schedule amount was within ten percent of the bill, then the payment schedule was considered to be satisfactorily modeling the FMS billing system. Additionally, the method was also subjected to a validity test.

The validity test performed, for not only this but also subsequent methodologies, determined if the internal workings of the method itself provided meaningful results. This, of course, included an examination of the data for any inconsistencies or discrepancies which would make a comparison between the payment schedule and the actual bill meaningless. Emory covered the term very succinctly in his book, Business Research Methods. His determination of validity was centered around the differences found with measuring tools and whether or not they reflect true differences (5:128). An analysis of the results and a determination as to the validity of the method is presented in Chapter 4. Since the decision criteria pertain to all three methods,

the next section describes the mechanics of the methods only.

Method #2

The second method used in the analysis compared the sum of the quarterly estimates on the payment schedule up to the date in question to the total financial requirements on the DD Form 645, column 12. This method should indicate how well the payment schedule was predicting the progress of the case overall. Therefore the method eliminates the quarterly fluctuation problem expected in method #1. However, if these quarterly fluctuations are indicative of a trend whereby the estimate and actual bills diverge by an ever-increasing amount, this trend information would become evident with this method.

Table 4.2 on page 44 shows the quarterly values for the cases chosen. For each quarter of each case chosen, the total financial requirement (DD Form 645, column 12) was subtracted from the corresponding cumulative value from the payment schedule. The resultant absolute value was then divided by the total financial requirement to obtain the percent difference between the total financial requirement and the cumulative payment schedule estimate. The payment schedule was considered accurate if this percent difference was within ten percent of the cumulative financial requirement. A fifty percent criteria was also used to accept or reject the overall effectiveness of the payment schedule. Method #2 was also subjected to a test for the validity

of the methodology involved.

Method #3

The third method of evaluating the accuracy of the payment schedule is the same method used to generate the FMS Payment Schedule Effectiveness Report, an example of which is provided in Appendix C. The inclusion of this method was required since this is the management system presently used for assessing the problem. An explanation of the form, its headings, and the methodology involved follows.

The FMS Payment Schedule Effectiveness Report is composed of seven columns. The first column indicates the case identifier from which the data came. The collections column shows the amount collected to date for that case. This is included on this form for information purposes only and is not used in any further calculations. The payment schedule to date is, as explained previously, the sum of quarterly estimated payments. Actual costs incurred are the cumulative values of deliveries to date, administrative fees, accessorial costs and actual progress payments made to the contractor (21). The difference column shows the result of subtracting the previous two columns. The variance standard is either $100,000 or ten percent of the payment schedule to date, whichever is higher (21). The value beyond variance is then the difference between the

difference column and the variance standard column. This final value is supposedly that amount over and above the ten percent allowance by which the payment schedule has failed to predict the contract costs.

The payment schedule was determined to be ineffective, if more than fifty percent of those samples fell into this category and, as in the two previous methods, a test for the validity was also performed to insure that the method was comparing like components. Having explained the three methods and outlined the decision criteria, the data collection plan examines the type of data needed for the three methods, the criteria used to select the data and the source of that data.

Data Collection Plan

The first step required in this analysis was the selection of cases to be used. One criteria for case selection was the case implementation date. In order to be as current as possible, and still obtain a sufficient number of sample cases, only cases since 1978 were chosen. Using cases since 1978 also provided a payment schedule generated by the most recent computer program. Additionally, these cases were less affected by technological change, changing lead time requirements, economic considerations and numerous other factors presently modeled by the computer program. Another criteria for case selection was the case type.

Only S, D, or Y cases were considered for examination.

Several reasons for using only S, D, or Y type cases were: 1) large systems type cases comprise a significant percentage of the total dollar value of all foreign military sales transactions although they are only a small percentage of the total number of cases (6), 2) multi-command complexity typical of large systems cases, and 3) large systems type cases typically involve more materiel from new procurement rather than items from DOD stocks.

Having determined the type of cases to be selected, enough cases were chosen so that a sample of at least 30 quarters of data would be available. After each case was selected and its data received, each quarter's set of information was assigned a sample number. These sample numbers were used consistently throughout. That is, the first entry or sample number one used in the first test method was the same case and quarter as sample number one in the second test method. This consistency provided a cross feed mechanism between the first two methods. The importance of this cross feed is explained in the description of method #2.

The documents required in this analysis were available from several different sources. The payment schedules were available through Headquarters USAF, Directorate of International Programs (USAF/PAI), and SAAC. They were requested from USAF/PAI since the actual DD Form 1513 for each case was also readily available at that location. The DD Form 1513 including 1513-1 and 1513-2

for each case was requested in order that each case history (i.e. changes, modifications, amendments) could be examined to insure the proper payment schedule and figures were being used. The quarterly bills or DD Form 645's, however, were obtained from SAAC along with the FMS Payment Schedule Effectiveness Reports.

Summary

The three methods used to determine the predictive capability of the FMS payment schedule were: 1) a comparison of the quarterly estimates according to the payment schedule and the actual amounts due and payable (DD Form 645, column 14), 2) a comparison of the cumulative estimates according to the payment schedule and the total financial requirements to date (DD Form 645, column 12), and 3) a comparison of the actual costs incurred to date and the cumulative estimate according to the payment schedule. Method #1 is used by the foreign customer much in the same way as an individual would compare estimates and actual costs. Method #2 is also used by the foreign customer as well as the U.S. Government FMS case manager to provide trend information as it relates to the overall contract. Method #3 is used by SAAC to generate the FMS Payment Schedule Effectiveness Report. The necessary data, reports, and information required to continue this research were obtained through USAF/PAI and SAAC.

An analysis of the computer program and of each method follows in Chapter 4. An evaluation is made of these methods consistent with the research objectives, research questions, and the methodology outlined in this chapter.

Chapter 4

RESULTS AND ANALYSIS

Introduction

The computer program and the three methods outlined in Chapter 3 were examined in detail. The computer program was reviewed to determine if it could handle all costs required of an FMS case. The three methods were evaluated using the sample data and the criteria outlined to obtain the results and test their validity.

The Computer Program

The computer program was examined to determine if it had the capability to handle those costs involved in an FMS case. A listing of the program and a copy of the user's guide was included in Appendix E. By the use of the program itself, and the user's guide, it was determined that the computer program was capable of including the numerous types of costs involved. This procedure ruled out the possibility that the LD29A/MOD 2 computer program's capabilities were a confounding factor in the comparison of the payment schedule and actual bill. This, of course, does not reflect the manner in which the estimates are handled in the generation of the payment schedule, which is another question outside the scope of this effort. The results of the data

analysis follow for each of the three methodologies.

Method #1

Method #1 compared the amount due and payable taken from the DD Form 645 and the corresponding quarterly estimate from the payment schedule. The table of data and results are shown in Table 4.1 on page 40. The final column, percent difference, shows how accurately the payment schedule predicted the monthly cost to the foreign government. According to the results, the quarterly payment schedule was not predicting, on a regular basis, the amount due and payable within the ten percent criteria. In 63.33% of the samples, the payment schedule was in error by more than the allowed ten percent. At times the payment schedule was as much as 95.1% different. The average percent difference for the sample quarters was 49.72%. There were quarters, though, where the payment schedule did predict the amount due and payable within ten percent. Further analysis, though, revealed not only the reasons for large deviations, but also that small deviations are not indicative of the predictive power of the payment schedule due to the lack of validity.

The first possible explanation for the deviations results from the payment amount received from the foreign customer. Several cases exist where the foreign governments paid either more or less than what was due according to the DD Form 645. This may be due to the foreign countries' own financial situations and method of

TABLE 4.1

Quarterly Estimate Vs. Quarterly
Amount Due (Dollars in Millions)

Sample Number	Payment Schedule Estimate	Amount Due and Payable	Difference	Percent Difference
1	39.7	75.9	36.2	47.69
2	36.2	75.9	39.7	52.31
3	23.7	99.5	75.8	76.18
4	8.6	68.5	59.9	87.45
5	4.0	14.5	10.5	72.41
6	3.3	0.0	3.3	---
7	2.1	0.0	2.1	---
8	6.1	21.6	15.5	71.76
9	3.8	9.9	6.1	61.62
10	1.5	11.4	9.9	86.84
11	1.2	2.7	1.5	55.56
12	0.9	0.0	0.9	---
13	0.5	0.0	0.5	---
14	0.2	0.0	0.2	---
15	103.8	70.9	32.9	46.40
16	197.5	168.1	29.4	17.49
17	179.2	243.5	64.3	26.41
18	45.9	45.9	0.0	0.0
19	6.9	16.4	9.5	57.93
20	4.5	20.9	16.4	78.47
21	1.0	5.6	4.6	82.14
22	18.3	44.8	26.5	59.15
23	9.0	0.0	9.0	---
24	1.4	28.6	27.2	95.1
25	0.4	2.4	2.0	83.3
26	0.1	0.1	0.0	0.0
27	1.3	1.3	0.0	0.0
28	2.4	3.7	1.3	35.14
29	2.2	2.2	0.0	0.0
30	2.3	2.3	0.0	0.0

handling their financial affairs. Just as there are times in our own system when funds are either taken away or unexpectedly provided by the legislature causing an adjustment of financial affairs, other countries may experience similar situations which in turn may cause the amount paid to differ from that requested. This fact was then reflected in the next quarter's billing and showed a deviation from the payment schedule.

Another reason for possible deviations could have been from inaccurate original estimates. Since numerous other costs are driven by this figure, a deviation in the actual cost from the original estimate will be multiplied throughout.

A third possible reason the payment schedule would deviate from the actual amount due may be a result of the deliveries of goods and services differing from the original delivery plan. Since goods and services are paid for upon delivery, the quarterly costs will fluctuate as a direct result of the fluctuation in deliveries. Since the computer program used in generating payment schedules is based on historical data from the sale of F-5's, deliveries may differ significantly should the production processes be dissimilar.

Another possible cause for the large percent deviation may possibly be understood upon inspection of the prediction model used by the computer program to generate the payment schedule. Understanding that the equation used in the model is a growth curve, the

sensitivity of the differences between the payment schedule and the amount payable will differ throughout the entire case. For example, the first few quarters' predicted costs may be very low. Suppose the payment schedule predicted a bill of $10,000. Should the actual bill be $15,000, a $5,000 deviation would be shown with the accompaning percentage of 33%. Suppose the payment schedule of the same contract in a subsequent quarter reflected an estimate of $1,000,000. The same $5,000 deviation in actual costs would then indicate that the payment schedule was in error by less than one percent.

In several instances, the results presented in Table 4.1 indicated the payment schedule was predicting exactly, the amounts due. Further analysis proved that the DD Form 645 had been generated using the payment schedule itself. This makes any comparison invalid. In addition, several instances of zero amounts due were initially assumed to be caused by overpayment on the part of the foreign government. Further analysis of this situation revealed that these quarters' data were close to the financial closure of the case. Since the amount required for contract termination in the latter stages of a contract was very small, that amount already collected for termination liability and on deposit was being used to pay for the quarterly deliveries.

Any one or combination of the above reasons may cause the quarterly amount due and payable to deviate from the estimate or the

payment schedule. The deviations due to underpayment or overpayment by the foreign government were detectable under the present system but required additional work. Detection of errors due to poor estimation of either costs or deliveries are, however, not possible since the present system does not break the payment schedule down into individual components. Therefore the results obtained from the sample data are inconclusive as to the effectiveness of the payment schedule. This was due to the fact that this method has been determined to be invalid. The results and analysis of method #2 follow.

Method #2

The second method used to evaluate the payment schedule was not only an attempt to account for the varying quarterly values but also to eliminate the possible errors due to underpayment or overpayment on the part of the foreign government. The second method of evaluation of the payment schedule compared the total financial requirements as stated in column 12 of the DD Form 645 and the cumulative estimates provided by the payment schedule. Table 4.2 on page 44 shows the data and results of this method. Recall also, that each sample number on this table coincided with the sample number on Table 4.1. That is, the data for sample one on Table 4.2 was derived from the same case and quarter that was used

TABLE 4.2

Cumulative Estimate Vs. Cumulative Financial Requirements (Dollars in Millions)

Sample Number	Cumulative Payment Schedule	Total Financial Requirements	Difference	Percent Difference
1	121.2	121.2	0.0	0.0
2	157.4	157.4	0.0	0.0
3	181.1	181.1	0.0	0.0
4	189.7	189.7	0.0	0.0
5	193.7	172.0	21.7	12.6
6	197.0	156.9	40.1	25.6
7	199.1	156.9	42.2	26.9
8	81.8	81.8	0.0	0.0
9	85.1	85.1	0.0	0.0
10	86.6	86.6	0.0	0.0
11	87.8	87.8	0.0	0.0
12	88.7	65.9	22.8	34.6
13	89.2	66.4	22.8	34.3
14	89.4	66.7	22.7	34.0
15	191.5	191.5	0.0	0.0
16	389.0	389.0	0.0	0.0
17	568.2	568.2	0.0	0.0
18	58.6	58.6	0.0	0.0
19	65.4	65.4	0.0	0.0
20	69.9	69.9	0.0	0.0
21	70.9	70.9	0.0	0.0
22	142.8	142.8	0.0	0.0
23	151.8	113.3	38.50	34.0
24	154.9	154.9	0.0	0.0
25	6.6	6.6	0.0	0.0
26	6.7	6.7	0.0	0.0
27	2.9	2.9	0.0	0.0
28	5.2	5.2	0.0	0.0
29	7.5	7.5	0.0	0.0
30	9.8	9.8	0.0	0.0

to derive the data for sample one on Table 4.1. The results expressed in Table 4.2 indicate that the payment schedule was predicting the total cumulative costs in 76.67% of the quarters. It was therefore concluded that the payment schedule was satisfactorily modeling the FMS billing system. Because these results differed so radically from the results obtained earlier using the first method, further analysis of the DD Form 645 was accomplished.

The determination of total financial requirements was the sum of cumulative deliveries (column 10) and forecast requirements (column 11). The cumulative deliveries included all deliveries and associated costs plus an entry called progress payments. This entry included not only progress payments as defined in AFR 400-3 but also an amount collected and put in reserve for contract termination liability (21). What was included under this title is not important but the method by which the amount was calculated is suspect.

As defined previously, a progress payment is that amount billed by the contractor (14:A1-6), and termination liability is that amount associated with contract termination prior to completion (3:1). Consistently throughout the samples where zero difference was recorded, the amount recorded under progress payments appeared to be equal to the difference between the cumulative estimate according to the payment schedule and the cumulative deliveries. The total in column 10 of DD Form 645 therefore when added to the forecast requirements, which in every case was equal to the next quarter's

estimate on the payment schedule, resulted in the total financial requirements being equal to the cumulative estimate according to the payment schedule. The apparent use of the payment schedule to generate the entry for progress payments negated the effectiveness of this method as a tool for measuring the accuracy of the payment schedule. In those cases where the total financial requirements were not equal to the cumulative payment schedule, an analysis of the DD Form 645 showed a decrease in the total financial requirements from the previous quarter. This was due to the significant decrease in the amount required for termination liability, since all samples in this situation were taken from quarters nearing the completion of the financial aspect of the contract.

Even if these situations were remedied, the problems associated with cost and delivery estimates stated earlier must also be corrected. Therefore the lack of validity of this method also prevented the conclusion of any meaningful results from the sample data as to the predictive power of the payment schedule. In a final note concerning this method, the authors realize that the comparison of cumulative payment schedules to cumulative financial requirements, does reduce the inherent variability which is induced by the foreign customer's early or late payments. It is also clear that though this method is not a valid measure of payment schedule effectiveness, the calculations performed by SAAC to produce the bill did satisfy

two primary considerations. By adding the difference between the payment schedule and the actual costs, SAAC produced a bill which exactly matched the payment schedule, which was good for customer budget considerations, and SAAC also ensured the billing of at least that quarter's actual costs. SAAC may also have recovered all, or a portion, of the correct amount for contract termination. Even with these advantages, method #2 was still unable to provide a valid measure of payment schedule effectiveness.

Method #3

The third method used to evaluate the accuracy of the payment schedule was the same method used by SAAC to generate the FMS Payment Schedule Effectiveness Report. A sample of the results obtained when using this methodology are included in Table 4.3 below. The results in this table have been extracted from the

TABLE 4.3

Foreign Military Sale Effectiveness Report
Methodology (Dollars in Millions)

Payment Sch to Date	Actual Costs Incurred to Date	Difference	Variance Std Used	Value Beyond Variance
7.457	2.474	4.983	.748	4.235
177.3	123.98	53.32	17.73	35.59
69.97	32.10	32.87	6.997	25.873
154.9	132.1	22.8	15.49	7.31
389.0	20.9	368.1	38.9	329.2

FMS Payment Schedule Effectiveness Report. Out of the seven cases from which the quarterly data was extracted, five of the cases were entries on the January 1980 edition of the FMS Payment Schedule Effectiveness Report. The reader will recall that if a case is included in the report, then, by definition, there was too great a discrepancy between the bill and the payment schedule. Since five of the seven cases sampled appeared on the report the payment schedule was concluded to be ineffective by this method. The two cases not on the report were very close to financial completion and thus were expected to be within limits. Once again an in-depth analysis was necessary not only to find explanations for these, but also to test the method's validity.

The results of the analysis showed that the payment schedule to date column and the actual costs incurred to date column were not composed of identical cost components. In order to be a valid comparison, those cost components used in the payment schedule must relate on a one to one basis with those cost components used to compute actual costs incurred to date. As stated previously, the breakdown of actual costs incurred to date included the cost of actual deliveries, administrative fees, accessorial costs and progress payments already made to the contractor (21). Having already determined that the payment schedule includes an entry for contract termination liability, the validity of the comparison broke down since there was no entry for contract termination in the actual costs incurred to date. Therefore the analysis revealed that the method was invalid

and did not permit any conclusion as to the predictive power of the payment schedule.

Summary

It is evident from the analysis that there were problems associated with each method. Method #1 appeared to have the most problems, however some, such as the underpayment or overpayment problem can be easily accounted for with additional work. A problem common to both method #1 and method #2 was the accuracy of the original estimate. Since this estimate drives numerous other costs such as administrative fees or accessorial costs, an estimation error will be multiplied throughout. Another problem common to these two methods involved the deliveries. Should the production process deviate from that projected, a significant change may cause bills to deviate from the payment schedules. The valid comparison problem in method #3 and the use of the payment schedule itself in method #2 also appeared to be major problem areas. Therefore because of these problems, all three methods were rejected as valid measures of the predictive capability of the payment schedule. The conclusions of this research effort now follow in Chapter 5.

Chapter 5

SUMMARY AND CONCLUSIONS

Summary

FMS is one method by which the United States carries out its foreign policy. It is important for both the U.S. Government and the foreign customer to know the expected value of the goods and services to be delivered in a particular quarter. Very few countries are not limited by financial constraints and therefore the purchase of military hardware and services is just one factor among many that any country must consider during their financial planning process. Without this estimate any realistic financial planning is impossible. It is also important fc FMS trust fund management to have an estimation of the costs which would accrue to the United States in the event that a contract was terminated early. Without this knowledge, it is possible that contractors, involved in a procurement or production case, or DOD agencies would suffer severe monetary loss which is not in the best interest of the national economy. Neither is it in the best interest of the United States foreign policy to appear to predict one amount payable and then bill a higher amount. For these reasons, it is concluded to be fact that it is important to have and to be able to

measure the effectiveness of an FMS payment schedule.

The results and analysis presented in the previous chapter rejected the current methodologies as valid measures of the capability of the FMS payment schedule to predict quarterly FMS amounts payable. Each had more than one major flaw in the derivation of its data which made any resulting conclusions invalid. For the most part, the main validity problem common to all three measures was the comparison of two aggregations of costs which were computed in two different ways. One method included a certain type of cost, while the other calculation to which it was being compared did not include that cost. To paraphrase the old sage, one should not compare apples and oranges. The data used in the tests had also been aggregated to such a high level that had any of the tests been used, no identifiable cause for variance could be determined without exhaustive and man-hour intensive investigations into many separate files. For these reasons, the real effectiveness of the FMS payment schedule is not currently known. The lack of valid performance indicators for the payment schedule can only serve to increase the time delay that FMS case managers must endure before becoming aware of schedule and cost differences.

The following section contains detailed conclusions with respect to the initial research questions. The answers to the questions were in some cases precipitators of important recommendations

which are presented and discussed in Chapter 6.

Conclusions

Research Question #1

What conclusions can be drawn with respect to the validity of three selected methodologies used to test the effectiveness of the FMS payment schedule?

With respect to the definition of validity referenced in the chapter concerning results and analysis, the differences between payment schedules and billing statements, obtained by any of the three selected methods, cannot be considered valid. Method #1 compared a quarterly bill to the corresponding quarterly payment schedule. Method #2 compared cumulative payment schedules to cumulative financial requirements, and method #3 made use of the Payment Schedule Effectiveness Reports. None of these three methods adequately accounted for the variance induced by the differences between projected costs and actual costs for the equipment or services sold. None of the three methods in fact included even the same costs, and consequently were concluded to be invalid tests of the effectiveness of the payment schedule.

Research Question #2

Is the correlation or lack thereof, between the results

obtained from each of the methodologies meaningful?

If the three methods selected to test the effectiveness of the payment schedule were valid measures of its effectiveness, they would each have given the same result. Application of the three methodologies on the sample data resulted in methods #1 and #3 each concluding that the payment schedule was not effective, and method #2 concluding the opposite. However, since none of the three methods were valid tests, the lack of correlation between the results was not significant. The reader should keep in mind, that any comparison of forecast data to actual data is frequently subject to error. If the projected data is the same kind of data as the actual data then the variance between the projected and actual data is indicative of the effectiveness of the predictive model. A range of differences is generally considered acceptable within certain limitations. In this research a variance limit of ten percent was used because, as of this writing, no other variance standard has been put forth. In the authors' judgement, the ten percent variance standard was appropriate for the three tests of the payment schedule's effectiveness. However, in order to be valid, the variance standard should be a variance of ten percent from the cumulative financial requirement, not from the payment schedule, assuming the other validity problems can be solved. Recommendations for solving the validity problems are addressed in Chapter 6.

Research Question #3

What difference between payment schedule generation and bill preparation prevent direct one to one comparisons?

During the course of the research, several sources of variance between the projected bill, i.e., the payment schedule, and the actual bill were uncovered. Such things as estimation error in costs, estimation error in deliveries, the fact that the computer model is based on only recent F-5 sales, and others previously mentioned, all contribute to differences between projected and actual financial requirements. Allowing for the fact that there usually are errors in any forecast or estimation, the critical factor which must be guarded against is the comparison of calculations which were computed using different costs. This is the largest controllable flaw in each of the methodologies tested. The authors' concluded that had SAAC used the same amount for contract termination that was used by the payment schedule computation, then the method of comparing cumulative payment schedule amounts to cumulative financial requirements would have provided the least invalid method of measuring the effectiveness of the payment schedule. Other factors could still influence the variance, but they are those factors of deliveries and actual costs which must be compared with projections to determine if the estimates were in error or the payment schedule model is in

error. The isolation of the causes of disparity between payment schedules and bills is the subject of the next research question.

Research Question #4

Is it possible to isolate the causes of the disparity or remove their effect to permit a valid evaluation of payment schedule effectiveness?

Based upon this research into FMS financial management, the authors conclude that the situation requires attention and that it is necessary and possible to conduct a valid evaluation of payment schedule effectiveness. However, in order for this to occur, several interrelated steps must be undertaken to determine the cause of differences between the payment schedule and the bill. By insuring that SAAC uses the same amount for contract termination liability reserve as computed for the case in the payment schedule, and by comparing cumulative payment schedules to cumulative financial requirements, a comparison can be made which will yield a variance. This variance may be caused by incorrect estimates of the materiel values and deliveries, or by the cost growth model in the FMS payment schedule program. By fixing a variance standard to prevent transient and inconsequential deviations from prompting unnecessary management intervention, the case manager can then turn to his delivery reports and other documents to determine if materiel costs are the

same as those estimated on the DD Form 1513 and if the deliveries are the same as estimated. If those costs and deliveries have remained the same, then the difference is due to the computer model which may be recovering costs too early or too late. This is something which previous chapters have explained as being important for the U.S. Government to know.

Other general conclusions resulting from this research effort but which did not specifically relate to the research questions are included here. The authors concluded that financial management in FMS is a complex and difficult task for any system. FMS is replete with built in management problems caused by changing definitions and the changing international environment. The relationship between the DD Form 645 Billing Statement and the FMS payment schedule was not well defined by any official document relating to FMS financial management. Additionally, there was no documented consideration given to an acceptable variance standard for the deviations which are certain to exist between estimated values and actual values. The lack of an appropriate variance standard is felt by the authors to have contributed significantly to the current inability to measure the effectiveness of the FMS payment schedule.

Having discussed the conclusions of this effort, the remaining important task for any research into FMS financial management is to suggest appropriate changes and make recommendations for

further research. Hopefully the result of the efforts in the next chapter will be to provide valuable help to concerned FMS managers who realize that there is a problem but, so far, have not found the solution to this particular problem.

Chapter 6

RECOMMENDATIONS

Introduction

This chapter contains an organized presentation of the authors' suggested changes and recommendations for further study. They are grouped into four sections, each of which discusses the suggested changes, advantages, disadvantages, and areas in which further critical analysis is deemed to be advisable. The four sections are: 1) the FMS payment schedule, 2) the FMS Billing Statement, 3) the FMS Payment Schedule Effectiveness Report, and 4) the relationships of each to the other. Following the discussion of changes and areas for study, a short summary restates the value and importance of FMS and valid financial management.

The authors recognize the overall complexity of the FMS program. Also recognized is the fact that even small changes may reverberate throughout the whole system producing more problems than were initially solved. It is in this light that the following changes and recommendations for further study are suggested.

The FMS Payment Schedule

The present format of the FMS payment schedule could be improved for use both by the U.S. Government and the foreign customer in terms of providing the necessary information to make meaningful comparisons between the payment schedule and the billing statement.

One additional factor which, if separately identified, would assist all parties concerned in evaluating the performance of the payment schedule is the amount for contract termination liability. The format of the payment schedule should include on a quarterly basis: 1) an entry for the projected value of deliveries, 2) an entry for the projected termination liability reserve, 3) a total quarterly amount, and 4) a cumulative estimate. All the necessary data would then be available as far as the payment schedule is concerned to perform any one of the three methodologies used in this study. The computer program LD29A/MOD 2 would require a modification to the print out subroutine to separately identify the amount for contract termination liability reserve. This amount is currently used in the program's calculations, but is not printed out. It would be an advantage for evaluating the payment schedule's effectiveness if this amount were separately identified. This one factor was a major problem with each of the three methodologies. This entry will also enable a

foreign customer to make intelligent budgetary decisions concerning the termination of a contract. Ultimately, the objective of this change is to create and preserve an audit trail, without which any meaningful evaluation of the capability of the FMS payment schedule is not possible. It must be remembered that the FMS payment schedule should model the FMS Billing Statement. Without a method of validating the model, the model is of questionable value to either the foreign customer or the U.S. Government.

In the area of payment schedule preparation and initial estimations of prices and deliveries, two subjects were uncovered by the authors' research which beg for additional research. Most important of the two, in the authors' judgement, is the development of some method to provide feedback to the makers of initial price and availability estimates on what actual prices and deliveries were after the case was implemented. Without this feedback control loop, the FMS payment schedule must tolerate greater variances than are necessary. Another area which is also important, and is currently receiving emphasis from DSAA, concerns the calculation of an appropriate contract termination liability reserve. The authors' judgements in this area would suggest that demystifying this reserve amount and presenting it in the clear on the payment schedule and the billing statement will do much to prevent the unforeseen costs to the U.S. Government similar to those costs incurred by the U.S. Navy

when Iran cancelled its contracts (16:6).

The FMS Billing Statement (DD Form 645)

The major problem with the FMS Billing Statement (DD Form 645) is the method used by SAAC to account for contract termination liability. As was presented previously, the amount for contract termination liability is calculated by totaling the deliveries and fees plus progress payments and subtracting this amount from the cumulative estimate according to the payment schedule. This entry for contract termination as generated here has no bearing on what the actual costs would be in the event of the termination of a contract. The recommended change is therefore, that the amount used for contract termination by SAAC must be the same amount estimated on the payment schedule. In addition, a separate entry should be included on the DD Form 645, entitled "Contract Termination." This will permit the proper evaluation of the payment schedule since separately identifiable cost components would be available. This evaluation will enable the earlier identification of those elements of cost which are different from forecast, and the detection of an inappropriate model of the system incorporated in the LD29A/MOD 2.

Thus far the proposed changes involve format changes to both the payment schedule and the billing statement. These changes

will identify contract termination liability costs at any point in the duration of the contract. The FMS Payment Schedule Effectiveness Report is discussed next with emphasis placed once again on the comparison of data which should be calculated from similar costs.

FMS Payment Schedule Effectiveness Report

The FMS Payment Schedule Effectiveness Report, though standing in widespread disrepute because of its invalid comparisons, seems to have potential for management, if the comparisons could be made with validity. The revival of the FMS Payment Schedule Effectiveness Report and the improved computation of contract termination liability by SAAC can be accomplished now, for certain cases, by using information contained in the Termination Liability Worksheet.

As previously mentioned the Termination Liability Worksheet is completed for all FMS cases valued over $7,000,000. The fourth column in this worksheet contains the cumulative projected value of deliveries and proportionate fees for a particular quarter and more importantly, separates the estimated amount for contract termination liability (see Appendix D). It is the recommendation of the authors, that the FMS Payment Schedule Effectiveness Report should be changed so that the comparison and evaluation performed by this report uses the projected value of deliveries which

do not contain amounts for termination liability reserve to compare with the actual costs incurred to date. By using information from the Termination Liability Worksheet, for comparison with actual costs incurred from the FMS Payment Schedule Effectiveness Report, a valid evaluation of payment schedule effectiveness can be made. Both of these figures are calculations based on the value of deliveries. Neither calculation includes the amount for contract termination liability reserve.

Currently, the FMS Payment Schedule Effectiveness Report uses a variance standard of ten percent. At definite fault here, in the opinion of the authors, is that the report has selected the wrong variable upon which to set the ten percent standard. The reader will remember from previous chapters that the payment schedule should model the bill and not vice versa. The FMS Payment Schedule Effectiveness Report's variance standard is calculated such that in order for the payment schedule to be within tolerance, the bill must be within ten percent of the payment schedule! Therefore the considered judgement of the authors is that the FMS Payment Schedule Effectiveness Report should apply the variance standard to the total costs incurred. This would mean that the costs projected by the payment schedule, should be within ten percent of the actual costs. The ten percent figure used in the previous sentence is for

illustration only. Further study is recommended to determine if the range of differences afforded by a ten percent variance standard is either too great or too narrow.

The previous three documents are involved in FMS financial management. Also deeply involved are the relationships between these documents and the organizations which are responsible for creating them. The next section will discuss these important relationships.

Relationships

According to the GAO, the reason that SAAC is needed to perform centralized billing and collecting functions for FMS was that the military services' efforts at FMS accounting had failed (15:1-10). The GAO has suggested further centralization of the FMS financial management by recommending that management of the FMS program be a DOD function and not the responsibility of the military services. The recommended short term solution, according to the GAO, is for the DOD to strengthen a steering committee for identifying FMS financial management problems (15:Cover). If this trend toward more centralization is to continue, then the following difficult subjects are recommended to the FMS steering committee for their consideration.

The authors of this thesis question the necessity or the

propriety of charging and collecting contract termination liability reserve from all countries that participate with the United States in FMS. Certainly it is recognized that if the contract is not terminated early, there is no additional cost to the customer, but, the fact is that money was collected and held in the trust fund when no cost had been incurred. The sensitive political question of which countries should be required to pay the contract termination liability reserve must be decided with full weight applied, both to the legal requirement to recover all costs and also to the importance of international relations. The authors suggest that the determination of which countries are to be charged contract termination liability reserve should be made by the Department of State in the same way that it is responsible for determining which countries are permitted dependable undertaking status.

While the question of who should be charged the contract termination liability reserve amount is important, just as critical is the requirement to determine the proper formula for computing the reserve amount. This study did not address the issue of calculating the proper amount for the reserve but it does recommend that the FMS steering committee examine this issue to determine if all services are using appropriate variations for their unique situations. It appeared obvious to the authors of this research that no single method would be appropriate for all FMS cases even within one service. It

is recommended that the services calculate the contract termination liability amount and that SAAC use this amount, and no other, in their billing calculations.

It is suggested that whatever the formula used to compute contract termination costs, whether it is cost performance reporting, straight line percentages, or historical data base, it is of inestimably greater value to accurate FMS financial accounting, if it is able to be identified separately. Until this occurs, there is no audit trail.

The authors have concluded that the greatest efficiency is obtained if the military services continue to manage FMS accounts. In order to ensure valid and meaningful comparisons between the payment schedules and the billing statements, it has been recommended that an appropriate variance standard be determined, that an appropriate method for calculating contract termination liability reserve amounts be devised, and that the relationship between the FMS payment schedule and the FMS Billing Statement be established firmly such that the payment schedule models the bill, and the billing statement does not emulate the payment schedule. Additionally, the recommendation has been made that the amount calculated for contract termination liability reserve should be separately identifiable on both the payment schedule and the billing statement. The reader must remember that the foreign customer receives both documents. The customer should not be confused by a payment schedule that does

not predict actual bills within an acceptable variance standard, nor should the customer's budget be forced to react to unforecast financial requirements.

Having answered the research questions and accomplished the research objectives, the following section summarizes the direction and purpose of this research. Also included is a judgement by the authors of their efforts to solve the research problem.

Summary

The complex subject of foreign military sales, with its great effect on all levels of the federal government, and its far reaching consequences for national security and the national economy, has, in this document, been examined from a financial management point of view.

Improvements are required in three significant financial documents, the FMS payment schedule, the FMS Billing Statement, and the FMS Payment Schedule Effectiveness Report. The recommendations for change were made with full consideration given to the relationships between the documents themselves and the agencies involved in their preparation. It is the opinion of the authors that this research, the first documented evaluation of any methodology to measure the effectiveness of the FMS payment schedule, not only recommends changes that correct present deficiencies, but also

fosters other improvements in the management of customer accounts which will improve international business relationships. By performing this inaugural research effort into the complex subject of FMS financial management, this thesis may have raised more questions than it solved, however, in the final analysis by solving the research problem there is a clearer understanding of those other problems which have no doubt been raised.

APPENDIX A

SAMPLE DD FORM 1513

UNITED STATES DEPARTMENT OF DEFENSE
OFFER AND ACCEPTANCE

(1) PURCHASER *(Name and Address) (Zip Code)*

(2) PURCHASER'S REFERENCE | (3) CASE IDENTIFIER

OFFER

Pursuant to the Arms Export Control Act, the Government of the United States (USG) hereby offers to sell to the above purchaser the defense articles and defense services listed below (hereinafter referred to collectively as "items" and individually as "defense articles" or "defense services"), subject to the terms contained herein and conditions set forth in Annex A, and to such other special terms and conditions which may be a part of, and appended to, this Offer and Acceptance.

(4) _____
Signature *(US Dept./Agency Authorized Representative)*

(5) _____
Typed Name and Title

(6) ADDRESS: _____

(7) DATE: _____

(8) THIS OFFER EXPIRES:

(9) _____
Countersignature *(Office of the Comptroller, DSAA)*

(10) _____
Typed Name and Title

(11) DSAA ACCOUNTING ACTIVITY _____

ITEM NO. (12)	ITEM DESCRIPTION (Including Stock Number / Appropriation) (13)	QUANTITY (14)	UNIT OF ISSUE (15)	UNIT COST (16)	TOTAL COST (17)	AVAILABILITY AND REMARKS (18)	OFFER SEC. LEASE CODE (19)	DELIVERY TERM CODE (20)

(21)	ESTIMATED COST	$
(22)	ESTIMATED PACKING, CRATING, AND HANDLING COST	
(23)	ESTIMATED GENERAL ADMINISTRATIVE COSTS	
(24)	ESTIMATED CHARGES FOR SUPPLY SUPPORT ARRANGEMENT	
(25)	OTHER ESTIMATED COSTS *(Specify)*	
(26)	ESTIMATED TOTAL COSTS	$

(27) TERMS

(28) AMOUNT OF INITIAL DEPOSIT – $

ACCEPTANCE

(29) I am a duly authorized representative of the Government of _____ and upon behalf of said Government, accept this offer under the terms and conditions contained herein (30) this _____ day of _____ 19 ____

(31) _____
SIGNATURE

(32) _____
TYPED NAME AND TITLE

(33) MARK FOR CODE _____

(34) FREIGHT FORWARDER CODE _____

(35) PROCURING AGENCY _____

(36) DESIGNATED PAYING OFFICE _____

(37) ADDRESS OF DESIGNATED PAYING OFFICE _____

DD FORM 1 AUG 77 1513 PREVIOUS EDITIONS ARE OBSOLETE. PAGE 1 of PAGES

A. THE GOVERNMENT OF THE UNITED STATES.

1. Agrees to furnish such items from its Department of Defense (hereinafter referred to as "DOD") stocks and resources, or to procure them under terms and conditions consistent with DOD regulations and procedures. When procuring for the Purchaser, the DOD shall, in general, employ the same contract clauses, the same contract administration, and the same inspection procedures as would be used in procuring for itself except as otherwise requested by the Purchaser and as agreed to by the DOD. Unless the purchaser has requested that a sole source contractor be designated, and this Letter of Offer and Acceptance reflects acceptance of such designation by the DOD, the Purchaser understands that selection of the contractor source to fill this requirement is solely the responsibility of the Government of the United States (hereinafter referred to as "USG"). **Further, the Purchaser agrees that the United States DoD is solely responsible for negotiating the terms and conditions of all contracts necessary to fulfill the requirements in the Letter of Offer.**

2. Advises that when the DOD procures for itself, its contracts include warranty clauses only on an exceptional basis. However, the USG shall, with respect to items being procured, and upon timely notice, attempt to the extent possible to obtain any particular or special contract provisions and warranties desired by the Purchaser. The USG further agrees to exercise, upon the Purchaser's request, any rights (including *those arising under any warranties) the USG may have under any contract connected with the procurement of any items. Any additional cost* resulting from obtaining special contract provisions or warranties, or the exercise of rights under such provisions or warranties, or any other rights that the USG may have under any contract connected with the procurement of items, shall be charged to the Purchaser.

3.a. Shall, unless the condition is otherwise specified herein (e.g., "As is"), repair or replace at no extra cost defense articles supplied from DOD stocks which are damaged or found to be defective in respect of material or workmanship, when it is established that these deficiencies existed prior to passage of title, or found to be defective in design to such a degree that the items cannot be used at all for the purpose for which they were designed. Qualified representatives of the USG and of the Purchaser, upon notification pursuant to paragraph B.6 below, shall agree on the liability of the USG hereunder and the corrective steps to be taken.

b. With respect to items being procured for sale to the Purchaser, the USG agrees to exercise warranties on behalf of the Purchaser pursuant to A.2, above to assure, to the extent provided by the warranty, replacement or correction of such items found to be defective.

c. In addition, the USG warrants the title of all items sold to the Purchaser hereunder. The USG, however, makes no warranties other than those specifically set forth herein. In particular the USG disclaims any liability resulting from patent infringement occasioned by the use or manufacture by or for Purchaser outside the United States of items supplied hereunder.

4. Agrees to deliver and pass title to the items to the Purchaser at the initial point of shipment unless otherwise specified in this Offer and Acceptance. With respect to defense articles procured for sale to the Purchaser, this will normally be at the manufacturers' loading facilities; with respect to defense articles furnished from stocks, this will normally be at the U.S. depot. Articles will be packed, crated or otherwise prepared for shipment prior to the time title passes. If "Point of Delivery" is specified otherwise than the initial point of shipment, the supplying Military **Department or Defense Agency will arrange movement of the items to the authorized delivery point as reimbursable service but will pass title at the initial point of shipment. The USG disclaims any liability for damage or loss to the items incurred after passage of title irrespective of whether transportation is by common carrier or by the U.S. Defense Transportation System.**

5. Advises that (a) Unless otherwise specified, USG standard items will be furnished without regard to make or model.

6. The price of items to be procured shall be at their total cost to the USG. Unless otherwise specified, the cost estimates of items to be procured, availability determination, payment schedule, and delivery projections quoted are estimates based on current available data. The USG will use its best efforts to advise the Purchaser or its authorized representatives by DD Form 1513-2:

(1) Of any identifiable cost increase that might result in an increase in the Estimated Total Costs in excess of 10 percent.

(2) Of any changes in the payment schedule(s), and

(3) Of any delays which might significantly affect the estimated delivery dates

but its failure to so advise of the above shall not affect the Purchaser's obligation under paragraphs B.1 and B.3 below.

The USG will, however, use its best efforts to deliver items or render services for the amount and at the times quoted.

7. [illegible] unusual and compelling circumstances when the national interest of the United States so requires, the USG reserves the right to cancel or suspend all or part of this Offer and Acceptance at any time prior to the delivery of defense articles or performance of services (including training). The USG shall be responsible for all termination costs of its suppliers resulting from cancellations or suspensions under this paragraph.

8. Shall refund to the Purchaser any payments received hereunder which prove to be in excess of the final total cost of delivery and performance of this Offer and Acceptance and are not required to cover arrearages on other open Offers and Acceptances of the Purchaser.

9. Advises that [illegible] performing defense services provided under this Offer and Acceptance will not perform any duties of a combatant nature, including any duties relating to training, advising, or otherwise providing assistance regarding combat activities, outside the United States in connection with the performance of these defense services.

10. Advises that in the assignment or employment of United States personnel for the performance of this Offer and Acceptance the USG will not take into account race, religion, national origin or sex.

11. Advises that notwithstanding Purchaser's agreement to pay interest on any net amount by which Purchaser may be in arrears on payments (as provided for in paragraph B.3.g. below), USG funds will not be used for disbursements by DOD or its contractors in the event of any such arrears in payments. Accordingly, failure by the Purchaser to make timely payments in the amounts due may result in delays in contract performance by DOD contractors, claims by contractors for increased costs (including the above mentioned interest costs), claims by contractors for termination liability for breach of contract or termination of contracts by the USG under this or other open Offers and Acceptances of the Purchaser at Purchaser's expense.

B. THE PURCHASER

1. Shall pay to the USG the total cost to the USG of the items, even if the final total cost exceeds the amounts estimated in this Offer and Acceptance.

2. Shall make payment(s) for the items by check(s) or by wire transfer payable in United States dollars to the Treasurer of the United States.

3.a. Shall, if "Terms" specify "cash with acceptance", forward with this Offer and Acceptance a check or wire transfer in the full amount shown as the estimated total cost, and agrees to make such additional payment(s) as may be specified upon notification of cost increase(s) and request(s) for funds to cover such increases.

b. Agrees, if "Terms" specifies payment to be "cash prior to delivery", to pay to the USG such amounts at such times as may be specified from time to time by the USG (including any initial deposit set forth under "Terms") in order to meet payment requirements for articles or services to be furnished from the resources of the U.S Department of Defense. USG requests for funds may be based on estimated requirements to cover forecasted deliveries of articles or costs to provide defense services. It is USG policy to obtain funds 90 days in advance of the time DOD plans such deliveries or incurs such expenses on behalf of the Purchaser.

c. Agrees, if "Terms" specify payment by "dependable undertaking" to pay to the USG such amounts at such times as may be specified from time to time by the USG (including any initial deposit set forth under "Terms") in order to meet payments required by contracts under which items are being procured, and any damages and costs that may accrue, or have accrued, from termination of contracts by the USG because of Purchaser's cancellation of this Offer and Acceptance under paragraph B.7 hereof. USG requests for funds may be based upon estimated requirements for advance and progress payments to suppliers, estimated termination liability, delivery forecasts or evidence of constructive delivery, as the case may be. It is USG policy to obtain such funds 90 days in advance of the time USG makes payments on behalf of the Purchaser.

d. Agrees, if "Terms" specify "payment on delivery", that bills may be dated as of the date(s) of delivery of the defense articles or rendering of the defense services, or upon forecasts of the date(s) thereof.

e. Agrees, if "Terms" specify payment under a Credit Agreement between the Purchaser and DOD, to pay to the USG on a "dependable undertaking" basis, in accordance with B.3.c. above, such costs as may be in excess of the amount funded by the Credit Agreement.

f. Agrees, that requests for funds or billings under paragraphs B.3.a. through e. above are due and payable in full on presentation, or, if a payment date is specified in the request for funds or bill, on the payment date so specified, even if such payment date is not in accord with the estimated payment schedule, if any, contained in this Offer and Acceptance. Without affecting Purchaser's obligation to make such payment(s) when due, documentation concerning advance and progress payments, estimated termination liability or evidence of constructive delivery or shipment in support of request for funds or bills will be made available to the Purchaser by DOD upon request. When appropriate, Purchaser will request adjustment of any questioned billed items by subsequent submission of required discrepancy reports in accordance with paragraph B.6, below.

g. Agrees to pay interest on any net amount by which it is in arrears on payments, determined by considering collectively all of the Purchaser's open Offers and Acceptances with the DOD. Interest shall be calculated on a daily basis. The principal amount of the arrearage shall be computed as the excess of cumulative financial requirements of the Purchaser over total cumulative payments after quarterly billing payment due dates. The rate of interest paid shall be a rate not less than a rate determined by the Secretary of the Treasury taking into consideration the current average market yield on outstanding short-term obligations of the USG as of the last day of the month preceding the net arrearage and shall be computed from the date of net arrearage.

3. Shall designate the Procuring Agency and responsible Paying Office and address thereof to which the USG shall submit requests for funds and bills under this Offer and Acceptance.

4. Shall furnish shipping instructions for the items with its acceptance of this Offer and Acceptance. Such instructions shall include (a) Offer/Release Code, (b) Freight Forwarder Code, and (c) the Mark for Code, as applicable.

5. Shall be responsible for obtaining the appropriate insurance coverage and customs clearances, and, except for items exported by the USG, appropriate export licenses.

6. Shall accept title to the defense articles at the initial point of shipment (see A.4. above). Purchaser shall be responsible for in-transit accounting and settlement of claims against common carriers. Title to defense articles transported by parcel post shall pass to the Purchaser on date of parcel post shipment. Standard Form 364 shall be used in submitting claims to the USG for overage, shortage, damage, duplicate billing, item deficiency, improper identification or improper documentation and shall be submitted by Purchaser promptly. Claims of $100.00 or less will not be reported for overages, shortages, or damages. Claims received after one year from date of passage of title or billing, whichever is later, will be disallowed by the USG, unless the USG determines that unusual and compelling circumstances involving latent defects justify consideration of the claim.

7. May cancel this Offer and Acceptance with respect to any or all of the items listed in this Offer and Acceptance at any time prior to the delivery of defense articles or performance of services (including training). It shall be responsible for all costs resulting from cancellation under this paragraph.

8. Shall, except as may otherwise be mutually agreed in writing, use the items sold hereunder only:

a. For the purposes specified in the Mutual Defense Assistance Agreement, if any, between the USG and the Purchaser.

b. For the purposes specified in any bilateral or regional defense treaty to which the USG and the Purchaser are both parties, if subparagraph a. of this paragraph is inapplicable; or

c. For internal security, individual self-defense, and/or civic action, if subparagraphs a. and b. of this paragraph are inapplicable.

9. Shall not transfer title to, or possession of, the defense articles, components and associated support material, related training or other defense services (including any plans, specifications or information) furnished under this Offer and Acceptance to anyone not an officer, employee or agent of the Purchaser (excluding transportation agencies), and shall not use or permit their use for purposes other than those authorized by 8.a. above, unless the written consent of the USG has first been obtained. To the extent that any items, plans, specifications, or information furnished in connection with this Offer and Acceptance may be classified by the USG for security purposes, the Purchaser shall maintain a similar classification and employ all measures necessary to preserve such security, equivalent to those employed by the USG, throughout the period during which the USG may maintain such classification. The USG will use its best efforts to notify the Purchaser if the classification is changed. The Purchaser will ensure, by all means available to it, respect for proprietary rights in any defense article and any plans, specifications, or information furnished, whether patented or not.

C. INDEMNIFICATION AND ASSUMPTION OF RISKS:

1. It is understood by the Purchaser that the USG in procuring and furnishing the items specified in this Offer and Acceptance does so on a nonprofit basis for the benefit of the Purchaser. The Purchaser therefore undertakes, subject to A.3. above, to indemnify and hold the USG, its agents, officers, and employees harmless from any and all loss or liability (whether in tort or in contract) which might arise in connection with this Offer and Acceptance because of: (i) injury to or death of personnel of Purchaser or third parties; (ii) damage to or destruction of (A) property of the DOD furnished to Purchaser or suppliers specifically to implement this Offer and Acceptance, (B) property of Purchaser (including the items ordered by Purchaser pursuant to this Offer and Acceptance, before or after passage of title to Purchaser), or (C) property of third parties; or (iii) patent infringement.

2. Subject to any express, special contractual warranties obtained for the Purchaser in accordance with A.2. above, the Purchaser agrees to relieve the contractors and subcontractors of the USG from liability for, and will assume the risk of, loss or damage to: (i) Purchaser's property (including the items procured pursuant to this Offer and Acceptance, before or after passage of title to Purchaser) and (ii) property of the DOD furnished to suppliers specifically to implement this Offer and Acceptance, to the same extent that USG would assume for its property if it were procuring for itself the item or items procured pursuant to this Offer and Acceptance.

D. ACCEPTANCE:

1. To accept this Offer and Acceptance, the Purchaser will not later than the expiration date of the Offer and Acceptance, as set forth herein, return three copies properly signed to the security assistance accounting center designated herein, accompanied by such initial deposit or other payment as may be required by the Terms herein. In addition, Purchaser will concurrently return three copies properly signed to the U.S. Military Department or Defense Agency making the offer. When properly accepted and returned as specified herein, the provisions of this Offer and Acceptance shall be binding upon the USG and the Purchaser.

2. It is understood that implementation of the Offer and Acceptance cannot proceed without a proper acceptance. Failure to comply with Terms and Conditions required for acceptance, as, for example, delay in submission of any required initial deposit or payment of full estimated cost, as the case may be, may require revision or reissue of the Offer and Acceptance.

3. Unless a written request for extension is made by the Purchaser and granted in writing by an authorized representative of the appropriate U.S. Military Department or Defense Agency, this Offer and Acceptance *shall terminate on the expiration date set forth herein.*

E. ENCLOSURES:

Enclosures attached hereto are, by this reference, incorporated herein and are made a part hereof as though set forth in full.

F. PUBLIC INSPECTION:

This Offer and Acceptance will be made available for public inspection to the fullest extent possible consistent with the national security of the United States.

EXPLANATORY NOTES

1. The item or reference numbers appearing in the "ITEM OR REF. NO." column may not correspond with references used in Purchasers' original request. However, this number, together with the case identifier shown should always be used as a reference in future correspondence.

2. Availability leadtime quoted is the estimated number of months required to complete delivery of the item(s) in accordance with the terms of delivery after receipt of acceptance of this Offer pursuant to Section D. of the Conditions, and the conclusion of appropriate financial arrangements. Phased deliveries are shown by quantity and leadtime for each increment, where applicable. Items for which delivery leadtime is not shown are noted in column headed "Item Description" as items to be installed in the applicable end item prior to shipment.

3. The planned source of supply for each item is expressed in the following codes:

S	(*)	Service Stocks
P	(*)	Procurement
R	(*)	Rebuild/Repair/Modification
X	(*)	Stock and procurement, e.g., initial repair parts
E	(*)	"Mimex" major items in long supply or excess

*Availability is stated in months.

4. Condition of the defense articles shown in the "AVAILABILITY AND REMARKS" column is expressed in the following codes:

A1	–	Items to be provided in existing condition without repair, restoration or rehabilitation which may be required. Condition indicated in item description.
M	–	Articles of mixed condition (new, reworked, and rehabilitated) may be commingled when issued. Example: repair parts, ammunition, set assemblies, kits, tool sets and shop sets.
S	–	Serviceable defense articles.
O	–	Obsolete or non-standard item in an "AS IS" condition for which repair parts support may not be available from DOD.
S	–	Substitute. Suitable substitutions may be shipped for unavailable defense articles unless otherwise advised by the Purchaser.
C	–	Reworked or rehabilitated defense articles possessing original appearance insofar as practicable, including all Modification Work Orders and Engineering Change Orders as applied to such defense articles when issued but defense articles should not be considered as having had total replacement of worn parts and/or assemblies. Only parts and components not meeting US Armed Forces serviceability tolerances and standards will have been replaced, in all instances such defense articles will meet US Armed Forces standards of serviceability.

5. Training notes:

AP	–	Annual Training Program.
SP	–	Special Training designed to support purchases of US equipment.
NC	–	This offer does not constitute a commitment to provide US training.
SC	–	US Training concurrently being addressed in separate Offer and Acceptance.
NR	–	No US training is required in support of this purchase.

6. For meaning of Delivery codes, see Military Assistance Program Address Directory (MAPAD).

7. The use of Offer/Release Codes "Y" and "Z" will incur a storage fee of .125% per month for shipment delays in excess of 15 days.

UNITED STATES DEPARTMENT OF DEFENSE
OFFER AND ACCEPTANCE

Continuation Sheet)

CASE IDENTIFIER

ITEM OR REF NO. (12)	ITEM DESCRIPTION *Including Stock Number if applicable* (13)	QUANTITY (14)	UNIT OF ISSUE (15)	ESTIMATED UNIT COST (16)	ESTIMATED TOTAL COST (17)	AVAILABILITY AND REMARKS (18)	OFFERED RELEASE CODE (19)	DELIVERY TERM CODE (20)

DD FORM 1513c

PAGE OF PAGES

UNITED STATES DEPARTMENT OF DEFENSE
AMENDMENT TO OFFER AND ACCEPTANCE

(1) PURCHASER (*Name and Address) (Zip Code*)

(2) PURCHASER'S REFERENCE	(3) AMD'T NO.	(4) CASE IDENTIFIER

OFFER TO AMEND

Pursuant to the Arms Export Control Act, the Government of the United States (USG) hereby offers to amend the above case for the purchase of defense articles and defense services subject to all other terms and conditions of the original case remaining unchanged.

(5) _____
Signature (*U.S Dept./Agency Authorized Representative*)

(6) _____
Typed Name and Title

(7) ADDRESS:

(8) DATE:

(10) _____
Countersignature (*Office of the Comptroller, DSAA*)

(11) _____
Typed Name and Title

(9) THIS OFFER TO AMEND EXPIRES:

(12) DESCRIPTION AND REASON(S) FOR AMENDMENT:

ITEM OR REF NO. (13)	ITEM DESCRIPTION (*Including Stock Number if applicable*) (14)	QUANTITY (15)	UNIT OF ISSUE (16)	UNIT COST (17)	TOTAL COST (18)	AVAILABILITY AND REMARKS (19)	OFFER RELEASE CODE (20)	DELIVERY TERM CODE (21)

	(a) PREVIOUS COST	(b) AMENDED COST
(22) ESTIMATED COST	$	$
(23) ESTIMATED PACKING, CRATING, AND HANDLING COSTS	$	$
(24) ESTIMATED GENERAL ADMINISTRATIVE COSTS	$	$
(25) ESTIMATED CHARGES FOR SUPPLY SUPPORT	$	$
(26) OTHER ESTIMATED COSTS (*Specify*)	$	$
(27) ESTIMATED TOTAL COSTS	$	$

(28) TERMS

ACCEPTANCE OF AMENDMENT

(29) I am a duly authorized representative of the Government of _____ and upon behalf of said Government, accept this offer to amend under the terms and conditions contained herein (30) this _____ day of _____ 19____

(31) TYPED NAME AND TITLE	(32) SIGNATURE

DD FORM 1 AUG 77 1513 – 1 PREVIOUS EDITIONS ARE OBSOLETE: PAGE OF PAGES

UNITED STATES DEPARTMENT OF DEFENSE

NOTICE OF MODIFICATION OF OFFER AND ACCEPTANCE

(1) PURCHASER (Name, Address, Zip Code)

(2) PURCHASER'S REFERENCE	(3) NOTICE NO.	(4) CASE DESIGNATOR

NOTICE OF MODIFICATION

The Government of the United States hereby notifies the purchaser of modification of the above designated case, as specified below. All other terms and conditions remain unchanged.

(5) SIGNATURE AND TYPED NAME AND TITLE OF AUTHORIZED U.S. REPRESENTATIVE

(6) DATE _____ (7) U.S. DEPARTMENT OF _____

(8) DESCRIPTION OF AND REASON(S) FOR MODIFICATION

CASE ITEM OR REF NO. (9)	ITEM DESCRIPTION (Including Stock Number if applicable) (10)	QUANTITY (11)	UNIT OF ISSUE (12)	ESTIMATED UNIT COST (13)	ESTIMATED TOTAL COST (14)	AVAILABILITY AND REMARKS (15)

RECAPITULATION OF TOTAL DD FORM 1513	(a) PREVIOUS COST	(b) REVISED COST
(16) ESTIMATED COST	$	$
(17) ESTIMATED PACKING, CRATING AND HANDLING	$	$
(18) ESTIMATED ADMINISTRATIVE CHARGE	$	$
(19) ESTIMATED CHARGES FOR SUPPLY SUPPORT	$	$
(20) OTHER ESTIMATED COSTS (Specify)	$	$
(21) ESTIMATED TOTAL COSTS	$	$

ACKNOWLEDGEMENT OF RECEIPT

(22) I am a duly authorized representative of the Government of _____ and upon behalf of said Government acknowledge receipt of this notice of modification, this (23) _____ day of _____ 19 ____

(24) TYPED NAME AND TITLE	(25) SIGNATURE

DD FORM 1 MAY 68 1513-2

APPENDIX B

SAMPLE DD FORM 645

PCN: TC-07-321

FOREIGN MILITARY SALES BILLING STATEMENT			UNITED STATES OF AMERICA DEPARTMENT OF DEFENSE/AIR FORCE		
1. TO: AIR FORCE	2. THIS IS A BILLING STATEMENT BASED ON CASH REQUIREMENTS. PAYMENT IS DUE BY: 79 JUN 15		3. STATEMENT NUMBER:	4. FOR PERIOD ENDED:	5. DATE PREPARED: 79 APR 13

CASE IDENTIFICATION AND DELIVERY STATUS				FINANCIAL STATUS				
6. CASE & RSN	7. TOTAL VALUE ORDERED	8. CUMULATIVE DELIVERY COSTS END PRIOR PERIOD	9. CURRENT PERIOD DELIVERY COSTS (ATTACHMENT 1)	10. CUMULATIVE DELIVERY COSTS & WORK IN PROCESS	11. FORECASTED REQUIREMENTS (NOTE A)	12. TOTAL FINANCIAL REQUIREMENTS	13. CUMULATIVE PAYMENTS RECEIVED	14. AMOUNT DUE AND PAYABLE
	131,700,000.00							
	AIRCRAFT FIGHTER F	-4E						
	500,000.00							
	CLASS IV MODIFICAT	ION-AGE						
	4,594,000.00	1,272,526.63	233,018.74	1,505,545.37				
	CLASS IV MODIFICAT	ION-AGE						
	6,318,600.00	1,722,847.29	494,773.83	2,206,621.00				
	A/C COMP,PARTS, AC	CSRYS						
	5,534,000.00							
	ENGINE JET J-33/A-	35						
	50,000.00	6,404.38	3,052.16	9,456.54				
	TECHNICAL ASSISTAN	CE						
	50,000.00							
	TECHNICAL ASSISTAN	CE						
	102,000.00							
	TECHNICAL ASSISTAN	CE						
	2,809,584.00							
	TECHNICAL ASSISTAN	CE						
	855,000.00							
	CLASS IV MODIFICAT	ION-AGE						
	1,188,000.00	107.83	30,247.74	30,355.57				
	A/C COMP,PARTS, AC	CSRYS						
	3,136,814.00	59,820.92	16,129.28	75,950.20				
	ADMINISTRATIVE FEE							
		110,465.78	15,167.38	125,633.16				
	ACCESSORIAL COSTS							
P/P	PROGRESS PAYMENTS			118,946,438.18				
CASE TOTAL	156,867,998.00	3,161,172.73	792,389.11	122,899,999.94	19,900,000.00	142,799,999.94	97,949,266.37	44,850,733.57

DD FORM 645 (JUN 78) PREVIOUS EDITIONS ARE OBSOLETE

25515

77

APPENDIX C

SAMPLE FOREIGN MILITARY SALES

EFFECTIVENESS REPORT

PCN: IC-07-305

FMS PAYMENT SCHEDULE EFFECTIVENESS REPORT

DATE PREPARED: 80 JAN 09
MONTH ENDED: 79 DEC 31

PART I - PAYMENT SCHEDULES BEYOND VARIANCE RANGE

COUNTRY:

IMPLEMENTING AGENCY: AIR FORCE

CASE	COLLECTIONS	PAYMENT SCHEDULE TO DATE	ACTUAL COSTS INCURRED TO DATE	DIFFERENCE	VARIANCE STANDARD USED	VALUE BEYOND VARIANCE
	66,899,999.66	66,899,999.66	54,874,317.69	12,025,681.97	6,689,999.96	5,335,682.01
	1,311,493.89	1,311,493.89	918,311.89	393,182.00	131,149.38	262,032.62
	395,625.00	143,582.94	464,428.78	320,845.84	100,000.00	220,845.84
	575,100.00	575,100.00	88,658.76	486,441.24	100,000.00	386,441.24
	609,115.00	609,115.00	.00	609,115.00	100,000.00	509,115.00
	2,994,396.63	2,988,896.04	502,189.85	2,485,906.19	298,809.60	2,187,096.59
	3,440,391.68	3,440,391.68	2,488,367.54	952,024.14	344,039.16	607,984.98
	10,199,999.85	9,899,999.85	6,762,664.84	3,137,335.01	989,999.98	2,147,335.03
	3,208,000.00	3,208,000.00	2,837,621.94	362,378.06	320,000.00	42,378.06
	1,337,992.84	1,439,383.84	1,170,222.66	269,161.18	143,938.38	125,222.80
	10,108,261.00	10,108,261.00	6,772,471.66	3,335,789.34	1,010,826.10	2,324,963.24
TOTAL IMPLEMENTING AGENCY	354,543,186.10	353,618,827.40	265,050,035.98	TOTAL NUMBER CASES WITHIN VARIANCE RANGE: 88,567,991.42		1

TOTAL NUMBER CASES ABOVE VARIANCE: 55
TOTAL NUMBER CASES BELOW VARIANCE: 2

TOTAL VALUE ABOVE VARIANCE: 52,565,565.57
TOTAL VALUE BELOW VARIANCE: 824,229.33CR
NET VALUE BEYOND VARIANCE: 51,741,336.24

DISTRIBUTION: BR FS CC KS

APPENDIX D

TERMINATION LIABILITY WORKSHEET

TERMINATION LIABILITY WORKSHEET

Case Identification: _____ Date: _____
(Agency, Country, Case Designator)

($ in millions)

Deposit Date	Total Payment		Estimated Disbursements		Contractor Holdback		Termination Liability	
	By Quarter	Cumulative	By Quarter	Cumulative	By Quarter	Cumulative	By Quarter	Cumulative

APPENDIX E

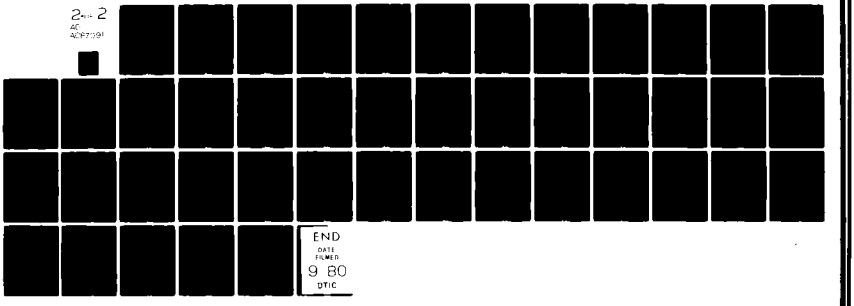
USER'S GUIDE AND COMPUTER LISTING

FOR LD29A/MOD 2 COMPUTER PROGRAM

AD-A087 091 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/1
AN ASSESSMENT OF CURRENT METHODOLOGIES USED TO EVALUATE FOREIGN--ETC(U)
JUN 80 J W DUTCHER, D C VANWIGGEREN

UNCLASSIFIED AFIT-LSSR-24-80 NL

2 OF 2
AD
A087091



END
DATE FILMED
9 80
DTIC

USER'S GUIDE FOR

FMS PAYMENT

SCHEDULE SYSTEM

SCHEDULE WORKSHEET INFORMATION

The FMS Payment Schedule program was developed to aid AF/ACMS in the preparation of payment schedule spread sheets for Foreign Military Sales Contracts. You, the user, have access to 16 commands which will allow you to enter all the information necessary to produce a payment schedule. Before running the program, you should prepare the schedule worksheets.

The main heading may be from 1 to 8 lines of 45 characters each. Omission of the main heading will not effect the numerical outcome of the program.

The blocks under "Starting Month" and "Starting Year" should be filled with the Start Time, a month and year to which all other dates will be referenced. The following two blocks should contain the number of months after the start time that the first and last deliveries are to occur. Be sure that the latter entries are numbers and not dates. For example if the starting date is January 1980, and the date of the first delivery is April 1981, then the number in the third block should be 15.

Before the specific schedule information can be entered, a knowledge of the schedule types is necessary. The program consists of 12 different types of schedule information that can be applied to line items of the Letter of Offer and Acceptance (LOA), Part B of

the Schedule Worksheet. Additionally, the "0" schedule type can be varied from the standard curve by substituting percentages to reflect the estimated payment schedule. A description of the schedule types is as follows:

Type 0 -

Applicable to any line item entry where the implementor wants to identify the beginning and ending months when it has been determined that none of the other types is representative. In this case, the output data does not key to the "Starting Month" or "First Delivery" as occurs with all other types

Type 1 -

Used for aircraft, missiles, and electronic equipment procurements.

Type 2 -

Used for munitions procurements.

Type 3 -

Used for initial spares procurements.

Type 4 -

Used for procurement and delivery of spare engines.

Type 5 -

Used for reconaissance nose kits.

Type 6 -

Used for technical services including contractor engineering technical services (CETS).

Type 7 -

Used for management services.

Type 8 -

Used for training.

Type 9 -

Used for travel.

Type 10 -

Used for preparation and overseas ferrying of aircraft.

Type 11 -

Used for ferrying of aircraft where no preparation is necessary.

Procurements not identified above or non-standard procurements will normally use schedule type 1.

The schedule types are summarized in the table below.

SCHEDULE TYPE TABLE

Schedule type	Beginning month	Ending month
1	0	LD+1
2	0	FD-1
3	0	FD-1
4	7	LD+1
5	FD	LD+1
6	FD	LD+1
7	0	LD+1
8	FD-6	FD+5
9	0	LD+1
10	FD-1	LD+1
11	FD-1	LD+1

FD = First delivery
LD = Last delivery

At this time the Specific Schedule Information may be entered. For each item, record the column number, schedule type, and total cost. The last column under Part B should be reserved for the subtotal. You will not have to enter this column, but you must be aware of its placement in order to correctly position subsequent columns. You may wish to choose your own beginning and ending months. If so, use schedule type "0" and record your choices in number of months after the starting date.

You may also choose not to use the standard scheduling factors and wish to specify your own. Make sure that these percentages add to 100.

The total cost must be entered in dollars. You may later change the output units to thousands of dollars or millions of dollars in the Quarterly Schedule by using the DIVIDE command.

Each column heading may be from 1 to 7 lines of 8 characters each with wraparound. Therefore, if you enter a 56 column heading, it will be broken down into 7 fields of 8 characters each, with each field occupying one line of the heading. So, be careful of halved words--use spaces to insure proper heading positioning. Omission of the column headings will not affect the numerical outcome of the program.

Part C of the Schedule Worksheet is for surcharge information. For each surcharge, record the column number, the column heading (if desired), the percentage, the number of columns that will be surcharged, and then list those columns. For convenience, use the SUBTOTAL column if you wish to take a percentage of every column. NOTE:

a. All time-related computations depend upon the START values, and many of the computations are made as the data is entered. Therefore, if you wish to change the START values, you must also re-enter all other input except the main heading.

b. When entering information, enter data for regular columns first and then for surcharge columns. Do not attempt to add new regular columns after surcharge columns.

COMMANDS

You have a choice of 16 commands, each having a different function. The commands and a description of each are given below. Each command must be entered in upper case only. Also, do not use commas in numerical fields. For example, "10,000" should be entered as "10000". Spaces should be used only in titles or headings.

BYE < CR >

Don't use this command until you are finished with the program and have nothing more to do on the computer; it acts just as a BYE from outside the program would act: by logging you off. If you want to exit the program but stay on the computer use the SYST command.

CARWID, entry < CR >

Not all terminals have the same number of character positions per line, nor does all paper. This command allows the number of characters printed per line to be specified; 72, 80, 118 and 132 are the available values. The default is 80.

COL < CR > (wait for prompt) entry, entry, entry, character entry < CR > Accepts column number, schedule type, total amount, and column heading.

COL is the main data entry command. It allows you to add columns or change the information in existing columns. When adding columns, entries should be in consecutive ascending order; reentering a column to change it can be done at any time without regard for order. The 'schedule type' entry for this command provides the user with 11 different relational options; the relation established is between delivery dates, starting month specified with the START command, and first and last payment dates. E.g., if schedule type 1 is specified, first payment will be at the starting date, last payment will be one month after final delivery date. (Remember that first and last delivery times are entered as the third and fourth elements of the START command.) (See 'schedule type' table on page .) If none of the schedule types are satisfactory, 0 (zero) may be entered as the schedule type, allowing you to specify starting and ending dates for payment independent of delivery dates. Entering "DONE" in response to the "next line" query will terminate the command.

DIVIDE, entry < CR >

The numbers printed out in the quarterly schedule summary are often too long to be easily interpreted. For this reason (and because of column width considerations) the DIVIDE command may be used to specify a divisor for the summary data, with permissible values of 1, 1,000 and 1,000,000. E.g., if one of your three-month

(quarterly) totals is $5,000,000 and you issue the command "DIVIDE, M" (M is for Millions of dollars, T for Thousands and D for just dollars), that quarter's sum will be given as 5 in the quarterly summary schedule table. I.e., 5,000,000 divided by 1,000,000 equals 5.

DONE < CR >

The COL, MAINHD and SUR commands are designed to allow input to continue until all normal columns, heading lines or surcharge columns desired have been entered. When entry is complete, signify this to the program by entering DONE in response to the "another line" query.

HELP < CR >

If you're running this program and forget just what commands are available to you, entering HELP will provide you with this list of them.

LIST < CR >

LIST provides a summary of all parameter values controlling calculations.

LP, entry < CR >

This command sets the level of prompting you will receive. Higher numbers produce lengthier prompts: 1 or 2 provide minimal prompting, 3 or 4 provide normal prompting, and 5 or greater

provide maximum prompting. The default is 3. As you become more familiar with the procedure, you may desire to limit the amount of material the program prints to prompt you.

MAINHD < CR > (wait for prompt) entry, entry < CR > Accepts heading line number, one line of heading text (45 chars. max.)

This command allows program output to be assigned a general heading of up to 8 lines, with 45 characters per line. If blank lines between heading components are desired, simply skip some line numbers in the data entry sequence. E.g., you might enter:

1, This is the < CR >

5, main heading < CR >

leaving 3 blank lines within the heading. Entering "DONE" in response to the "next line" query will terminate the command.

NEWR < CR >

This command allows you to start over without exiting and reentering the program. Everything you have entered will be erased.

RUN < CR >

The RUN command may be issued as often as desired at any time while entering or changing data, so long as the computational essentials have been entered (must have used START and COL, at

least.) Both monthly and quarterly schedules are printed.

RUNM < CR >

This is a variation of the RUN command, providing only a monthly schedule.

RUNQ < CR >

This is a variation of the RUN command. It provides only a quarterly schedule.

START, entry, entry, entry, entry < CR > Accepts first payment month, first payment year, first delivery month, and last delivery month.

START establishes a basic time framework, providing reference points for subsequent referrals to points in or periods of time. First payment month is defined as one month after the letter of offer's approval. First and last delivery months are given relative to first payment month as number of months after first payment month. E.g., if first payment month is January, 1979, and first and last deliveries are in April and August, respectively, START would appear as: START, 1, 79, 3, 6. References to months in other portions of the program are defined as above: as number of months after first payment month.

SUR < CR > (wait for prompt) entry, entry, . . . , entry < CR > Sets percent value of surcharge, number of columns, and column numbers.

This command allows surcharges be levied on one or more columns. There may be multiple surcharge columns. Care must be taken concerning the order of entry of SUR columns. Surcharges can't be levied on columns not yet entered (or error message will result.) And columns which are once designated as surcharge columns can't be changed (through the COL command) to regular data columns; errors result. The subtotal column may be referenced in your surcharge entry; e.g., if you want to levy a common surcharge on all columns entered thus far, instead of listing each one, simply specify the subtotal column as the only column to be surcharged. If the commands COL and SUR have both been used and the user wishes to change some data using COL, he must reenter any surcharge columns which affect the columns changed (after they've been changed.) This is necessary because surcharges are computed at the time the SUR command is given; reentering COL information should affect related SUR columns, but won't unless SUR is reissued to use the new data. There are 2 kinds of possible surcharges; regular and *. The regular surcharge applies to all months in the payment schedule. The * surcharge will take the entered percent of the sum of the totals from the specified columns and spread it evenly across the months beginning with the first delivery month and

ending with the last delivery month. To use the * surcharge insert a * before the percent when entering the surcharge information. Do not put a comma between the * and the percent. Entering "DONE" in response to the "next line" query will terminate the command.

SYST < CR >

SYST terminates the program and returns control to the system. It has two uses: reinitializing the program (gets rid of all data the user has entered), and allowing you to direct your efforts toward some other project (i.e. you don't want to log off yet.)

You are now running the FMS Payment Schedule System. You may choose any of the 16 commands previously described. There is a suggested order. Refer to your Schedule Worksheet and enter the information in that order. The commands required to enter each piece of information are located to the right of each heading in parentheses. The example on pages 96-99 should be helpful.

SCHEDULE WORKSHEET

A. General Schedule Information (MAINHD and START)

Heading: Sample Payment Schedule
Country XYZ

Starting Month	Starting Year	No. of Months to First Del.	No. of Months to Last Del.
9	80	6	15

B. Specific Schedule Information (COL)

Column	Sched. Type	Beg. Month	End. Month	Special Factors	Amount	Column Heading
1	3				225000	Airplane $
2	10				11000	Spare $$$ Engines
3	8				1500	Travel
4	0	3	10		26000	Planning
5	0	2	7	10, 20, 20, 20, 20, 10	12700	
6						(Subtotal)

SCHEDULE WORKSHEET

C. Surcharges (SUR)

Column	Title	Percent	How Many Surcharged Columns	Nos. of Columns to be Surcharged
7	PC&H	2	3	1, 2, 4
8	Admin	2.8	1	6

```
Help desired?
(Enter Y for yes;  < CR >  for no)
=

next command
=MAINHD

another line
=1, Sample Payment Schedule

another line
=2, Country XYZ

another line
=DONE

next command
=START, 9, 80, 6, 15

next command
=COL

another line
=1, 3, 225000, Airplane

another line
=2, 10, 11000, Spare Engines

another line
=3, 8, 1500, Travel

another line
=4, 0, 26000, Planning

Beginning, end
=3, 10

Use standard sched. factors?  (Y/N)
=Y

another line
=5, 0, 127000
```

```
Beginning, end
=2, 7

Use standard sched. factors?  (Y/N)
=N

Enter percentages
=10, 20, 20, 20, 20, 10

another line
=DONE

next command
=SUR

Enter column number and heading
=7, PC&H

Enter %, #cols, col #'s
=2, 3, 1, 2, 4

Enter column number and heading
=8, Admin

Enter %, #cols, col #'s
=2.8, 1, 6

Enter column number and heading
=DONE

next command
=CARWID, 118

next command
=RUN

Space top of page to top of plastic; hit < CR >
=
```

Sample Payment Schedule
Country XYZ
07/17/79

	1 Airplane	2 Spare Engines	3 Travel	4 Planning	5	6 Subtotal	7 PC&H	8 Admin	9 Totals
SEP 80	12847	86	23	0	0	12956	259	363	13578
OCT 80	31199	171	46	0	0	31416	627	880	32923
NOV 80	56709	257	72	0	12700	69738	1139	1953	72830
DEC 80	67720	352	108	866	25400	94446	1379	2644	98469
JAN 81	45697	470	153	1829	25400	73549	960	2059	76568
FEB 81	10828	616	196	3302	25400	40342	295	1130	41767
MAR 81	0	780	225	5006	25400	31411	116	880	32407
APR 81	0	949	229	5939	12700	19817	138	555	20510
MAY 81	0	1094	199	5246	0	6539	127	183	6849
JUN 81	0	1187	140	2936	0	4263	82	119	4464
JUL 81	0	1206	75	876	0	2157	42	60	2259
AUG 81	0	1137	34	0	0	1171	23	33	1227
SEP 81	0	977	0	0	0	977	20	27	1024
OCT 81	0	749	0	0	0	749	15	21	785
NOV 81	0	503	0	0	0	503	10	14	527
DEC 81	0	300	0	0	0	300	6	8	314
JAN 82	0	166	0	0	0	166	2	5	173
TOTALS	225000	11000	1500	26000	127000	390500	5240	10934	406674

Sample Payment Schedule
Country XYZ

PAYMENT DATE	DOLLARS
15 JUN 80	13578
15 SEP 80	204222
15 DEC 80	150742
15 MAR 81	31823
15 JUN 81	4510
15 SEP 81	1626
15 DEC 81	173

COMPUTER LISTING FOR LD29A/MOD 2

COMPUTER PROGRAM

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0000000C~~~~~~~~~~~~~~~~~~AS OF 10 APR 79~~~~~~~~~~~~~~~~~~~~
0010C
0020C    **********  PAYMENT SCHEDULE PROGRAM  **********
0030C
0040 DIMENSION IWID(4),IAM(43,121),ISFTAB(43),ISTTAB(43,3)
0050&  ,PER(43,120),V(120),NOL(20),NCOL(43,43),PCT(43)
0060 CHARACTER ANS*4,CHAR*1(132),LINE*132,KOM*6,HM*45(8),HC*8(42,7),
0070&M*3(12)
0080 CHARACTER ANS1*1,LINE1*100
0090 INTEGER STAT,S(12,2)
0100 DATA KIAM,KNCOL,KST/121,43,12/
0110 DATA KARWID,JWID,LP,NOLINE,NUM/80,6,3,1,1/
0120 DATA NSUB,MCL,STAT,KFLAG,ISWSUR/0,1,0,0,0/
0130 DATA IWID/72,80,118,132/
0140 DATA M/3HJAN,3HFEB,3HMAR,3HAPR,3HMAY,3HJUN,3HJUL,3HAUG,3HSEP,3HOCT,
0150&3HNOV,3HDEC/
0160 DATA LF,NDIV/0012,1/
0170 CALL FPARAM(1,100)
0180 CHARACTER FILE1*11/11HCZAP/DOCU1;/,FILE2*11/11HCZAP/DOCU2;/
0190C
0200C  ****  COMMAND SECTION  ****
0210C
0220 PRINT:
0230 PRINT:
0240 PRINT:
0250 PRINT:"                    FMS PAYMENT SCHEDULES (MOD2)"
0260 PRINT:
0270 PRINT:
0280 PRINT:"HELP DESIRED?"
0290 PRINT:"(ENTER Y FOR YES; <CR> FOR NO)"
0300 READ:ANS1
0310 IF (ANS1.EQ."Y") GO TO 2
0320 1 CONTINUE
0330 IF (LP.GE.5) PRINT:"PLEASE ENTER THE"
0340 IF (LP.GE.3) PRINT:"NEXT COMMAND"
0350 K=1 ; KOM=" "
0360 READ 1010,LINE
0370 DECODE (LINE,1020) KOM
0380 IF (KOM.EQ."TEST") CALL TESTB
0390 IF (KOM.EQ."TESTA") CALL AREA
0400 IF (KOM.EQ."H".OR.KOM.EQ."HELP") K=2
0410 IF (KOM.EQ."CARWID") K=3
0420 IF (KOM.EQ."MAINHD") K=4
0430 IF (KOM.EQ."START") K=5
0440 IF (KOM.EQ."COL") K=6
0450 IF (KOM.EQ."SUR") K=7
0460 IF (KOM.EQ."RUN") K=8
0470 IF (KOM.EQ."RUNM") K=8
0480 IF (KOM.EQ."RUNQ") K=13
0490 IF (KOM.EQ."LIST") K=9
0500 IF (KOM.EQ."LP") K=10
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0510 IF (KOM.EQ."BYE") K=11
0520 IF (KOM.EQ."SYST") K=12
0530 IF (KOM.EQ."NEWR") K=14
0540 IF (KOM.EQ."DIVIDE") K=15
0550 GO TO (27,2,4,9,15,20,21,22,24,25,28,29,23,35,30),K
0560C
0570C  **** HELP FOR USER ****
0580C
0590 2 CONTINUE
0600 PRINT:
0610 PRINT:"HOW MUCH HELPFUL INFORMATION WOULD YOU LIKE:"
0620 PRINT:"    1) A LITTLE (COMMAND AND COMMAND FORMAT LISTING)"
0630 PRINT:"    2) A LOT (ALL OF 1 PLUS IN-DEPTH COMMAND DESCRIPTION)"
0640 PRINT:"    3) NONE"
0650 PRINT:"(ENTER 1, 2 OR 3)"
0660 READ:I
0670 PRINT:
0680 IF (I.EQ.3) GO TO 99
0690 IF (I.EQ.1.OR.I.EQ.2) GO TO 41
0700 PRINT:"YOUR ANSWER MUST BE 1, 2 OR 3"
0710 GO TO 2
0720 41 CALL ATTACH(15,FILE2,1,0,STAT,)
0730 PRINT:"USER HELP"
0740 PRINT:
0750 IF (I.EQ.2) GO TO 43
0760C   **** PRINT BRIEF COMMAND DESCRIPTIONS ****
0770 42 READ(15,1015) LINE1
0780 CALL CONCAT(ANS1,1,LINE1,1,1)
0790 IF (ANS1.EQ."*") GO TO 42
0800 IF (ANS1.EQ."/") GO TO 3
0810 PRINT 1015,LINE1
0820 GO TO 42
0830C   **** PRINT ALL HELP ****
0840 43 CALL ATTACH(16,FILE1,1,0,STAT,)
0850 44 READ(16,1015) LINE1
0860  CALL CONCAT(ANS1,1,LINE1,1,1)
0870 IF (ANS1.EQ."*") GO TO 45
0880 IF (ANS1.EQ."/") GO TO 3
0890 PRINT 1015,LINE1
0900 GO TO 44
0910 45 READ(15,1015) LINE1
0920 CALL CONCAT(ANS1,1,LINE1,1,1)
0930 IF (ANS1.EQ."*".OR.ANS1.EQ."/") GO TO 44
0940 PRINT 1015,LINE1
0950 GO TO 45
0960 3 CONTINUE
0970 CALL DETACH(15,STAT,) ; CALL DETACH(16,STAT,)
0980 GO TO 99
0990C
1000C
```

```
1010C  **** LEVEL OF PROMPTING ****
1020C
1030 25 CONTINUE
1040 CALL CONCAT(LINE,1,LINE,4,128)
1050 NVAR=1
1060 CALL CCHECK(LINE,MIS,NVAR)
1070 IF (MIS.EQ.1) PRINT:"LP MUST BE NUMERIC"
1080 IF (MIS.EQ.1) GO TO 26
1090 DECODE (LINE,1020) LP
1100 26 GO TO 99
1110C
1120C  **** CARRIAGE WIDTH ****
1130C
1140 4 CONTINUE
1150 CALL CONCAT(LINE,1,LINE,8,124)
1160 NVAR=1
1170 CALL CCHECK(LINE,MIS,NVAR)
1180 IF (MIS.EQ.1) GO TO 6
1190 DECODE (LINE,1020) KARWID
1200 DO 5 N=1,4
1210 IF (KARWID.EQ.IWID(N)) GO TO 7
1220 5 CONTINUE
1230 6 PRINT:"MISTAKE IN NUMERICAL ENTRY"
1240 GO TO 8
1250 7 CALL FPARAM(1,KARWID)
1260 JWID=(KARWID-2)/10-1
1270 8 GO TO 99
1280C
1290C
1300C  **** MAIN HEADING ****
1310C
1320 9 CONTINUE
1330 IF (LP.GE.5) PRINT:"ENTER DATA FOR"
1340 IF (LP.GE.3) PRINT:"ANOTHER LINE"
1350 READ 1010,LINE
1360 DECODE (LINE,1020) ANS
1370 IF (ANS.EQ."DONE".OR.ANS.EQ."D") GO TO 13
1380 IF (ANS.EQ."L".OR.ANS.EQ."LIST") GO TO 11
1390 IF (KOM.EQ."BYE") GO TO 14
1400 NVAR=1
1410 CALL CCHECK(LINE,MIS,NVAR)
1420 IF (MIS.EQ.1) GO TO 10
1430 DECODE (LINE,1020) MHNUM
1440 IF (MHNUM.LT.1.OR.MHNUM.GT.8) GO TO 10
1450 IF (NOLINE.LT.MHNUM) NOLINE=MHNUM
1460 DECODE (LINE,1050) MHNUM,HM(MHNUM)
1470 GO TO 9
1480C
1490 10 PRINT:"MISTAKE IN ENTRY, RE-ENTER"
1500 GO TO 9
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```
1510C
1520 11 DO 12 N =1,NOLINE
1530 PRINT 1030,HM(N)
1540 12 CONTINUE
1550 GO TO 9
1560C
1570 13 GO TO 99
1580C
1590 14 CALL CALLSS("BYE #")
1600C
1610C  **** START TIME ****
1620C
1630 15 CONTINUE
1640 CALL CONCAT(LINE,1,LINE,7,125)
1650 NVAR=4
1660 CALL CCHECK(LINE,MIS,NVAR)
1670 IF (MIS.EQ.1) GO TO 16
1680 DECODE (LINE,1020) MON1,MYR1,MBEG,MEND
1690 IF (MON1.LT.1.OR.MON1.GT.12) GO TO 16
1700 IF (MYR1.GT.99) GO TO 16
1710 IF (MEND.LT.MBEG) GO TO 16
1720 IF (MEND.GT.KIAM-1) GO TO 16
1730 GO TO 17
1740 16 PRINT:"NON-NUMERIC OR LOGIC RELATION ERROR"
1750 GO TO 19
1760C
1770C  **** SCHEDULE TYPE TABLE ****
1780C
1790 17 DO 18 N=1,11
1800 S(N,1)=0
1810 S(N,2)=MIN0(MEND+1,KIAM-1)
1820 18 CONTINUE
1830 S(4,1)=7
1840 S(6,1)=MBEG
1850 S(8,1)=MAX0(MBEG-6,0)
1860 S(10,1)=MIN0(MBEG-1,0)
1870 S(11,1)=MIN0(MBEG+2,KIAM-1)
1880 S(2,2)=MAX0(MBEG-1,0)
1890 S(3,2)=MAX0(MBEG-1,0)
1900 S(8,2)=MIN0(MBEG+5,KIAM-1)
1910 19 GO TO 99
1920C
1930C  **** QUARTERLY TABLE DIVISOR ****
1940C
1950 30 CALL CONCAT(ANS1,1,LINE,8,1)
1960 NDIV=0
1970 DECODE(ANS1,1020) ANS1
1980 IF (ANS1.EQ."D") NDIV=1
1990 IF (ANS1.EQ."T") NDIV=2
2000 IF (ANS1.EQ."M") NDIV=3
```

```
2010 IF (NDIV.EQ.0) PRINT:"MUST BE D, T OR M"
2020 GO TO 99
2030C  FORMAT STATEMENTS
2040C
2050 1010 FORMAT(A132)
2060 1015 FORMAT(A80)
2070 1020 FORMAT(V)
2080 1030 FORMAT(1X,A45)
2090 1050 FORMAT(I1,1X,A45)
2100C
2110C
2120C
2130 20 CALL COLS(CHAR,HC,IAM,ISFTAB,ISTTAB,KFLAG,KIAM,KST
2140& ,LINE,LP,MCL,MON1,NOL,NSUB,NUM,PER,S,V)
2150C
2160 GO TO 99
2170 21 CALL SUR(CHAR,HC,IAM,KFLAG,KIAM,KNCOL,LINE,LP,MBEG,MCL,MEND
2180& ,NCOL,NSUB,NUM,PCT,S,ISWSUR)
2190 GO TO 99
2200C
2210 22 CALL RUN(HC,HM,IAM,JWID,KIAM,KOM,LF,M,MBEG,MCL,MHNUM
2220& ,MON1,MYR1,NOLINE,NSUB,NTOL,NUM,S,ISWSUR,NDIV)
2230 GO TO 99
2240C
2250 23 CALL QTR(HM,IAM,KIAM,KOM,LF,M,MBEG,MON1,MYR1,NOLINE,NUM,NTOL,
2260&NSUB,S,NDIV)
2270 GO TO 99
2280 24 CALL PPRINT(HC,HM,IAM,ISFTAB,ISTTAB,KARWID,KFLAG,KIAM,KNCOL
2290& ,LP,MBEG,MEND,MCL,MON1,NCOL,NOL,NOLINE,NSUB,NUM,PCT,PER,MYR1)
2300 GO TO 99
2310C
2320C  **** NEW RUN SECTION ****
2330C
2340 35 DO 50 I=1,43
2350 ISFTAB(I)=0
2360 PCT(I)=0
2370 DO 51 J=1,121
2380 51 IAM(I,J)=0
2390 DO 52 J=1,3
2400 52 ISTTAB(I,J)=0
2410 DO 53 J=1,43
2420 53 NCOL(I,J)=0
2430 50 CONTINUE
2440 DO 54 I=1,5
2450 DO 54 J=1,120
2460 PER(I,J)=0
2470 54 CONTINUE
2480 DO 55 I=1,20
2490 NOL(I)=0
2500 55 CONTINUE
```

```
2510 DO 60 J=1,8
2520 HM(J)=" "
2530 60 CONTINUE
2540 DO 62 J=1,42
2550 DO 62 K=1,7
2560 62 HC(J,K)=" "
2570 NUM=1
2580 ISWSUR=0
2590 GO TO 99
2600 27 PRINT:"UNRECOGNIZABLE COMMAND,RE-ENTER"
2610 99 GO TO 1
2620 28 CONTINUE
2630 CALL CALLSS("BYE #")
2640 29 CONTINUE
2650 STOP
2660 END
2670C
2680C
2690C
2700C  ****  SUBROUTINE COLS  ****
2710C
2720 SUBROUTINE COLS(CHAR,HC,IAM,ISFTAB,ISTTAB,KFLAG,KIAM,KST
2730& ,LINE,LP,MCL,MON1,NOL,NSUB,NUM,PER,S,V)
2740C
2750 CHARACTER CHAR*1(132),LINE*132,HC*8(42,7),KOM*4,ANS*1
2760 DIMENSION IAM(43,121),ISFTAB(43),ISTTAB(43,3),
2770& PER(43,120),V(120),NOL(20)
2780 INTEGER S(12,2),COL,COL2
2790C
2800 IF (NUM.GT.1) GO TO 32
2810 DO 31 N=1,42
2820 DO 31 I=1,7
2830 31 HC(N,I)="        "
2840 32 CONTINUE
2850 1 CONTINUE
2860 IF (LP.GE.5) PRINT:"ENTER DATA FOR "
2870 IF (LP.GE.3) PRINT:"ANOTHER LINE"
2880 READ 1010,LINE
2890 DECODE (LINE,1020) KOM
2900 IF (KOM.EQ."DONE".OR.KOM.EQ."D") GO TO 20
2910 IF (KOM.EQ."BYE") GO TO 24
2920 IF (KOM.NE."L".AND.KOM.NE."LIST") GO TO 2
2930 CALL COLIST(HC,IAM,ISFTAB,ISTTAB,KFLAG,KIAM,LP,MON1,MCL,PER,NOL,
2940&NSUB,NUM)
2950 GO TO 23
2960 2 CONTINUE
2970 NVAR=3
2980 CALL CCHECK(LINE,MIS,NVAR)
2990 IF (MIS.EQ.1) GO TO 8
3000 DECODE (LINE,1020) NMC,IST,IAM(NMC,KIAM)
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```
3010 IF (NMC.EQ.0) GO TO 8
3020 IF (IST.GT.11) PRINT:"SCHEDULE TYPE NUMBER MUST BE LESS THAN 12"
3030 IF (IST.GT.11) GO TO 1
3040 ISTTAB(NMC,1)=IST
3050 IF (NUM.LT.NMC) NUM=NMC
3060 DECODE (LINE,1040) (CHAR(I), I=1,132)
3070 NVAR=0
3080 NUMCHR=1
3090 DO 3 N=1,76
3100 IF (NVAR.EQ.3) GO TO 4
3110 NUMCHR=NUMCHR+1
3120 IF (CHAR(N).EQ.",".OR.CHAR(N).EQ." ") NVAR=NVAR+1
3130 3 CONTINUE
3140 4 CALL CONCAT(LINE,1,LINE,NUMCHR,56)
3150 DO 30 N=1,7
3160 30 HC(NMC,N)="        "
3170 DECODE (LINE,1030) (HC(NMC,N), N=1,7)
3180 LN=8
3190 5 LN=LN-1
3200 IF (LN.EQ.0) GO TO 6
3210 IF (HC(NMC,LN).EQ."        ") GO TO 5
3220 6 MCL=MAX0(MCL,LN)
3230 DO 7 N=1,KIAM-1
3240 V(N)=0
3250 IAM(NMC,N) = 0
3260 7 CONTINUE
3270 IF (IST.NE.0) GO TO 15
3280 GO TO 9
3290 8 PRINT:"NON-NUMERIC ENTRY OR UNRECOGNIZABLE COMMAND"
3300 GO TO 1
3310C
3320C    SPECIAL SCHEDULE TYPE
3330C
3340 9 CONTINUE
3350 IST=KST
3360 IF (LP.GE.5) PRINT:"ENTER DATES FOR"
3370 IF (LP.GE.3) PRINT:"BEGINNING, END"
3380 READ 1010,LINE
3390 DECODE (LINE,1020)KOM
3400 IF (KOM.EQ."DONE".OR.KOM.EQ."D") GO TO 23
3410 NVAR=2
3420 CALL CCHECK (LINE,MIS,NVAR)
3430 IF (MIS.EQ.1) GO TO 10
3440 DECODE (LINE,1020) S(12,1),S(12,2)
3450 IF (S(12,1).GT.KIAM-2) GO TO 10
3460 IF (S(12,2).GT.KIAM-1) GO TO 10
3470 IF (S(12,1).GT.S(12,2)) GO TO 10
3480 ISTTAB(NMC,2)=S(12,1)
3490 ISTTAB(NMC,3)=S(12,2)
3500 GO TO 11
```

```
3510 10 PRINT:"NON-NUMERIC OR UNACCEPTABLE ENTRY"
3520 GO TO 9
3530C
3540 11 PRINT:"USE STANDARD SCHED. FACTORS? (Y/N)"
3550 READ 1020,ANS
3560 IF (ANS.EQ."Y") ISFTAB(NMC)=1
3570 IF (ANS.EQ."Y") GO TO 15
3580 IF (ANS.NE."N") PRINT:"ANSWER (Y/N)"
3590 IF (ANS.NE."N") GO TO 11
3600C
3610C    NON-STANDARD FACTORS
3620C
3630 12 CONTINUE
3640 IF (LP.GE.3) PRINT:"ENTER PERCENTAGES"
3650 IF (LP.GE.5) PRINT:"FOR NON-STANDARD FACTORS"
3660 READ 1010,LINE
3670 DECODE (LINE,1020) KOM
3680 IF (KOM.EQ."DONE".OR.KOM.EQ."D") GO TO 23
3690 NVAR=S(IST,2)-S(IST,1)+1
3700 CALL CCHECK(LINE,MIS,NVAR)
3710 NVAR=S(IST,2)-S(IST,1)+1
3720 IF (MIS.EQ.1) GO TO 14
3730 PSUM=0.
3740 DECODE (LINE,1020) (V(N),N=1,NVAR)
3750 DO 123 I9=1,NVAR ; 123 PSUM=PSUM+V(I9)
3760 IF (PSUM.LT.99.9999) PRINT:"PERCENTAGES TOTAL LESS THAN 100%"
3770 IF (PSUM.GT.100.0001) PRINT:"PERCENTAGES TOTAL MORE THAN 100%"
3780 IF (PSUM.GT.100.0001.OR.PSUM.LT.99.9999) GO TO 12
3790 L=0
3800 DO 13 N=S(IST,1)+1,S(IST,2)+1
3810 L=L+1
3820 PER(NMC,L)=V(N)
3830 13 CONTINUE
3840 NOL(NMC)=L
3850 COL=S(IST,2)+1
3860 MSTOP=COL
3870 NCOLM=S(IST,1)+1
3880 GO TO 18
3890 14 PRINT:"NON-NUMERIC ENTRY/TOO FEW ENTRIES"
3900 GO TO 12
3910C
3920C    STANDARD FACTORS
3930C
3940 15 CONTINUE
3950 COL=MIN0(KIAM-1,S(IST,2)-S(IST,1)+1)
3960 COL2=MIN0(COL,KIAM-1-S(IST,1))
3970 CALL BUILD(COL2,V)
3980 MSTOP=S(IST,1)+COL
3990 NCOLM=S(IST,1)+1
4000C
```

```
4010C    APPLICATION OF SCHEDULE
4020C
4030 18 IRND=IAM(NMC,KIAM)
4040 DO 19 N=NCOLM,MIN0(NCOLM+COL-1,KIAM-1)
4050 IAM(NMC,N)=IFIX(IAM(NMC,KIAM)*V(N-NCOLM+1)/100+.5)
4060 IRND=IRND-IAM(NMC,N)
4070 19 CONTINUE
4080 MMSTOP=MIN0(KIAM-1,MSTOP)
4090 CALL ROUND(IAM,IRND,KIAM,MMSTOP,NMC,S,IST)
4100 GO TO 23
4110C
4120C     SUBTOTAL
4130C
4140 20 CONTINUE
4150 NSUB=NUM+1
4160 HC(NSUB,1)=8HSUBTOTAL
4170 DO 21 N=2,7
4180 HC(NSUB,N)="    "
4190 21 CONTINUE
4200 DO 22 N=1,KIAM
4210 IAM(NSUB,N)=0
4220 DO 22 N1=1,NSUB-1
4230 IAM(NSUB,N)=IAM(NSUB,N)+IAM(N1,N)
4240 22 CONTINUE
4250 GO TO 25
4260C
4270C     FORMAT STATEMENTS
4280C
4290 1010 FORMAT(A132)
4300 1020 FORMAT(V)
4310 1030 FORMAT(7(A8))
4320 1040 FORMAT(132(A1))
4330C
4340C
4350 23 GO TO 1
4360 24 CALL CALLSS("BYE #")
4370 25 CONTINUE
4380 RETURN
4390 END
4400C
4410C  ****  SUBROUTINE SUR  ****
4420C
4430 SUBROUTINE SUR(CHAR,HC,IAM,KFLAG,KIAM,KNCOL,LINE,LP,MBEG,MCL,MEND
4440& ,NCOL,NSUB,NUM,PCT,S,ISWSUR)
4450 CHARACTER ANS*1,KOM*4,CHAR*1(132),HC*8(42,7),LINE*132
4460 DIMENSION IAM(43,121),NCOL(43,43),PCT(43)
4470 INTEGER S(12,2)
4480C
4490 ISWSUR=1
4500 KFLAG=1
```

```
4510 1 CONTINUE
4520 IF (LP.GE.3) PRINT:"ENTER COLUMN NUMBER AND HEADING"
4530 IF (LP.GE.5) PRINT:"FOR NEXT COLUMN"
4540 READ 1010,LINE
4550 DECODE (LINE,1020) KOM
4560 IF (KOM.EQ."D".OR.KOM.EQ."DONE") GO TO 17
4570 IF (KOM.EQ."BYE") GO TO 16
4580 NVAR=1
4590 CALL CCHECK(LINE,MIS,NVAR)
4600 IF (MIS.EQ.1) GO TO 14
4610 DECODE (LINE,1020) NMC
4620 IF (NMC.LE.NSUB) GO TO 14
4630 IF (NUM.LT.NMC) NUM=NMC
4640 DO 2 N=1,KIAM
4650 IAM(NMC,N)=0
4660 2 CONTINUE
4670 DECODE (LINE,1030) (CHAR(I), I=1,60)
4680 NUMCHR=1
4690 DO 3 N=1,60
4700 NUMCHR=NUMCHR+1
4710 IF (CHAR(N).EQ.",".OR.CHAR(N).EQ." ") GO TO 4
4720 3 CONTINUE
4730 4 CALL CONCAT(LINE,1,LINE,NUMCHR,56)
4740 DO 20 N=1,7
4750 20 HC(NMC,N)="        "
4760 DECODE (LINE,1040) (HC(NMC,N), N=1,7)
4770 LN=8
4780 5 LN=LN-1
4790 IF (LN.EQ.0) GO TO 6
4800 IF (HC(NMC,LN).EQ."        ") GO TO 5
4810 6 MCL=MAX0(MCL,LN)
4820C
4830 PCT(NMC)=0
4840 NCOL(KNCOL,NMC)=0
4850 IF (LP.GE.3) PRINT:"ENTER %, #COLS, COL#'S"
4860 READ 1010, LINE
4870 CALL CONCAT(ANS,1,LINE,1,1)
4880 DECODE (ANS,1030) ANS
4890 IF (ANS.EQ."*") CALL CONCAT(LINE,1,LINE,2,131)
4900 NVAR=2
4910 CALL CCHECK(LINE,MIS,NVAR)
4920 IF (MIS.EQ.1) GO TO 14
4930 DECODE (LINE,1020) PCT(NMC),NCOL(KNCOL,NMC)
4940 NVAR=NCOL(KNCOL,NMC)+2
4950 CALL CCHECK(LINE,MIS,NVAR)
4960 IF (MIS.EQ.1) GO TO 14
4970 DO 7 N=1,NCOL(KNCOL,NMC)
4980 NCOL(N,NMC)=0
4990 7 CONTINUE
5000 DECODE (LINE,1020) PCT(NMC),NCOL(KNCOL,NMC),(NCOL(N,NMC),
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```
5010& N=1,NCOL(KNCOL,NMC))
5020 DO 8 N=1,NCOL(KNCOL,NMC)
5030 IF (NCOL(N,NMC).LT.1) GO TO 14
5040 IF (NCOL(N,NMC).GE.NMC) GO TO 14
5050 8 CONTINUE
5060 IF (ANS.EQ."*") GO TO 11
5070C
5080C     APPLICATION OF REGULAR SURCHARGE
5090C
5100 IRND=0
5110 DO 10 N=1,KIAM
5120 DO 9 N1=1,NCOL(KNCOL,NMC)
5130 IAM(NMC,N)=IAM(NMC,N)+IAM(NCOL(N1,NMC),N)
5140 9 CONTINUE
5150 IAM(NMC,N)=IFIX(PCT(NMC)*IAM(NMC,N)/100+.5)
5160 IRND=IRND+IAM(NMC,N)
5170 10 CONTINUE
5180 IRND=2*IAM(NMC,KIAM)-IRND
5190 IST=1
5200 CALL ROUND(IAM,IRND,KIAM,KIAM-1,NMC,S,IST)
5210 GO TO 15
5220C
5230C     APPLICATION OF * SURCHARGE
5240C
5250 11 CONTINUE
5260 DO 12 N=1,NCOL(KNCOL,NMC)
5270 IAM(NMC,KIAM)=IAM(NMC,KIAM)+IAM(NCOL(N,NMC),KIAM)
5280 12 CONTINUE
5290 IAM(NMC,KIAM)=IFIX(PCT(NMC)*IAM(NMC,KIAM)/100+.5)
5300 IRND=IAM(NMC,KIAM)
5310 DO 13 N=MBEG,MEND
5320 IAM(NMC,N)=IFIX(IAM(NMC,KIAM)/FLOAT(MEND-MBEG+1)+.5)
5330 IRND=IRND-IAM(NMC,N)
5340 13 CONTINUE
5350 IST=6
5360 CALL ROUND(IAM,IRND,KIAM,MEND,NMC,S,IST)
5370C
5380 GO TO 15
5390 14 PRINT:"NON-NUMERIC OR LOGIC RELATION ERROR"
5400 15 GO TO 1
5410C
5420 1010 FORMAT(A132)
5430 1020 FORMAT(V)
5440 1030 FORMAT(60(A1))
5450 1040 FORMAT(7(A8))
5460 16 CALL CALLSS("BYE #")
5470 17 CONTINUE
5480 RETURN
5490 END
5500C
```

```
5510C  ****  SUBROUTINE RUN  ****
5520C
5530 SUBROUTINE RUN(HC,HM,IAM,JWID,KIAM,KOM,LF,M,MBEG,MCL,MHNUM
5540& ,MON1,MYR1,NOLINE,NSUB,NTOL,NUM,S,ISWSUR,NDIV)
5550 DIMENSION IAM(43,121)
5560 CHARACTER ANS*1,DATE*8,HC*8(42,7),HM*45(8),KOM*6,LF*1,M*3(12)
5570 INTEGER S(12,2)
5580C
5590C    TOTALS
5600C
5610 IF (ISWSUR.EQ.0) GO TO 15
5620 IF (NUM.LT.NSUB) NUM=NSUB
5630 NTOL=NUM+1
5640 DO 1 N1=1,KIAM
5650 IAM(NTOL,N1)=0
5660 DO 1 N=NSUB,NTOL-1
5670 IAM(NTOL,N1)=IAM(NTOL,N1)+IAM(N,N1)
5680 1 CONTINUE
5690 HC(NTOL,1)="TOTALS"
5700 GO TO 20
5710 15 HC(NSUB,1)="TOTALS"
5720 NTOL=NSUB
5730C
5740C    PRINT SPREAD
5750C      PAGING,HEADING
5760C
5770 20 CONTINUE
5780 PRINT:
5790 PRINT:
5800 DO 2 N=1,NOLINE
5810 PRINT 1040, HM(N)
5820 2 CONTINUE
5830 CALL DATIM(DATE,TIME)
5840 PRINT 1050, DATE
5850C
5860C
5870 NPAGE=0
5880 DO 8 K=1,10
5890 LCNT=MHNUM+7
5900 IPB=JWID*NPAGE+1
5910 IPE=MIN0(NTOL,JWID*(NPAGE+1))
5920 PRINT 1060,(N,N=IPB,IPE)
5930 DO 3 J=1,MCL
5940 PRINT 1020,(HC(N,J),N=IPB,IPE)
5950 LCNT=LCNT+1
5960 3 CONTINUE
5970 PRINT:
5980 MON2=MON1-1
5990 MYR2=MYR1
6000C
```

```
6010C    PRINT ENTRIES
6020C
6030 NONZ=0
6040 DO 5 N=1,KIAM-1
6050 IF (IAM(NTOL,N).NE.0) NONZ=1
6060 IF (IAM(NTOL,N).EQ.0.AND.N.GT.MBEG.AND.NONZ.EQ.1) GO TO 6
6070 MON2=MON2+1
6080 IF (MON2.EQ.13) MYR2=MYR2+1
6090 IF (MON2.EQ.13) MON2=1
6100 PRINT 1030, M(MON2),MYR2,(IAM(I,N), I=IPB,IPE)
6110 LCNT=LCNT+1
6120 IF (LCNT.LT.60) GO TO 5
6130C ALL COMMENTS PRECEDED BY A * ARE LINES WHICH WERE ONCE USED FOR
6140C ALL COMMANTS PRECEDED BY AN * ARE LINES WHICH WERE ONCE USED FOR
6150C SPACING PERFORATED PAPER.  SINCE PERFORATED PAPER IS NOT USED
6160C AT THE PRESENT TIME, THE LINES HAVE BEEN DISABLED.
6170C * DO 4 N1=1,6
6180C * 4 PRINT,LF
6190C * LCNT=6
6200 DO 4 N1=1,4
6210 4 PRINT:"    "
6220 LCNT=0
6230 5 CONTINUE
6240 6 PRINT:
6250 PRINT 1070, (IAM(N,KIAM), N=IPB,IPE)
6260 LCNT=LCNT+2
6270 NLF=66-LCNT
6280C * DO 7 I=1,NLF
6290C * 7 PRINT,LF
6300 DO 7 I=1,6
6310 7 PRINT:"   "
6320 IF (NTOL.LE.JWID*(NPAGE+1)) GO TO 9
6330 NPAGE=NPAGE+1
6340 8 CONTINUE
6350 9 CONTINUE
6360 IF (KOM.EQ."RUN") CALL QTR(HM,IAM,KIAM,KOM,LF,M,MBEG,MON1,MYR1,
6370&NOLINE,NUM,NTOL,NSUB,S,NDIV)
6380C
6390C    FORMAT STATEMENTS
6400C
6410 1010 FORMAT(A132)
6420 1020 FORMAT(1X,10X,10(A8,2X))
6430 1030 FORMAT(1X,A3,3X,I2,1X,10(I9,1X))
6440 1040 FORMAT(1X,25X,A45)
6450 1050 FORMAT(40X,A8)
6460 1060 FORMAT(1X,10X,10(3X,I2,5X))
6470 1070 FORMAT(1X,6HTOTALS,3X,10(I9,1X))
6480 RETURN
6490 END
6500C
```

```
6510C  ****  SUBROUTINE QTR  ****
6520C
6530 SUBROUTINE QTR(HM,IAM,KIAM,KOM,LF,M,MBEG,MON1,MYR1,NOLINE,NUM,NTOL,
6540&NSUB,S,NDIV)
6550 DIMENSION IAM(43,121),JQTR(40)
6560 CHARACTER ANS*1,HM*45(8),KOM*6,LF*1,M*3(12),DATE*8
6570 CHARACTER DIVHD*9(3)
6580 DIVHD(1)="AMOUNT" ; DIVHD(2)="THOUSANDS" ; DIVHD(3)="MILLIONS"
6590 INTEGER S(12,2)
6600C
6610 IF (KOM.NE."RUNQ") GO TO 2
6620C TO ALLOW USER TIME TO POSITION PAPER PROPERLY, REMOVE THE "C"'S
6630C FOLLOWING LINES.
6640 PRINT:"SPACE TOP OF PAGE TO TOP OF PLASTIC;  HIT <CR>"
6650 READ 1010, ANS
6660 IF (NUM.LT.NSUB) NUM=NSUB
6670 NTOL=NUM+1
6680 DO 1 N1=1,KIAM
6690 IAM(NTOL,N1)=0
6700 DO 1 N=NSUB,NTOL-1
6710 IAM(NTOL,N1)=IAM(NTOL,N1)+IAM(N,N1)
6720 1 CONTINUE
6730 2 DO 3 N=1,NOLINE
6740 PRINT 1020, HM(N)
6750 3 CONTINUE
6760 CALL DATIM(DATE,TIME)
6770 PRINT 1060, DATE
6780 PRINT:
6790 IF (NDIV.EQ.1) DIV=1.
6800 IF (NDIV.EQ.2) DIV=1000.
6810 IF (NDIV.EQ.3) DIV=1000000
6820 PRINT 1005,DIVHD(NDIV)
6830 LCNT=9
6840C
6850C    CALCULATE ENTRIES
6860C
6870 MYR2=MYR1
6880 IRND=IFIX(IAM(NTOL,KIAM)/DIV+.5)
6890 DO 4 K=1,40
6900 JQTR(K)=0
6910 4 CONTINUE
6920 MREM=MOD(MON1,3)
6930 IF (MREM.EQ.1) N=3
6940 IF (MREM.EQ.2) N=2
6950 IF (MREM.EQ.0) N=1
6960 K=1
6970 DO 5 I=1,N
6980 JQTR(K)=JQTR(K)+IAM(NTOL,I)
6990 5 CONTINUE
7000 JQTR(K)=JQTR(K)/DIV+.5
```

```
7010 IRND=IRND-JQTR(K)
7020 IZER=0
7030 DO 7 K=2,40
7040 N=I
7050 DO 6 I=N+1,N+3
7060 IF (IAM(NTOL,I).NE.0) IZER=1
7070 IF (IAM(NTOL,I).EQ.0.AND.I.GT.MBEG.AND.IZER.EQ.1) GO TO 8
7080 JQTR(K)=JQTR(K)+IAM(NTOL,I)
7090 6 CONTINUE
7100 JQTR(K)=JQTR(K)/DIV+.5
7110 IRND=IRND-JQTR(K)
7120 7 CONTINUE
7130 GO TO 11
7140 8 JQTR(K)=JQTR(K)/DIV+.5 ; IRND=IRND-JQTR(K)
7150 IF (I.NE.N+1) K=K+1
7160 11 N=KIAM
7170 20 N=N-1
7180 IF (IRND.EQ.0) GO TO 21
7190 IF (N.EQ.0) JQTR(N)=JQTR(N)+IRND
7200 IF (N.EQ.0) GO TO 21
7210 IF (JQTR(N).EQ.0) GO TO 20
7220 IF (MREM.EQ.1) MON3=MON1-1
7230 JQTR(N)=JQTR(N)+IRND
7240 IF (JQTR(N).GE.0) GO TO 21
7250 IRND=ABS(JQTR(N))
7260 JQTR(N)=0
7270 21 CONTINUE
7280 IF (MREM.EQ.1) MON3=MON1-1
7290 IF (MREM.EQ.2) MON3=MON1-2
7300 IF (MREM.EQ.0) MON3=MON1-3
7310 IF (MON3.EQ.0) MYR2=MYR1-1
7320 IF (MON3.EQ.0) MON3=12
7330C
7340C    PRINT QUARTERLY REPORT
7350C
7360 NQTOT=0
7370 DO 9 N=1,K-1
7380 NQTOT=NQTOT+JQTR(N)
7390 PRINT 1030,M(MON3),MYR2,JQTR(N)
7400 LCNT=LCNT+1
7410 MON3=MON3+3
7420 IF (MON3.GE.13) MYR2=MYR2+1
7430 IF (MON3.GE.13) MON3=MON3-12
7440 9 CONTINUE
7450 PRINT:
7460 PRINT 1040, NQTOT
7470 PRINT,LF
7480 N=71-LCNT-NOLINE-3
7490C  SKIP TO TOP OF PAGE
7500CIF (KOM.EQ.KOM) GO TO 12
```

```
7510 IF (KOM.NE."RUNQ") GO TO 12
7520C           WHEN THE USER WANTS TO HAVE A NICELY SPACED QTR RUN,
7530C                REMOVE 7164 AND TAKE THE "C" OFF OF 7165
7540 DO 10 I=1,N
7550 10 PRINT,LF
756C 12 CONTINUE
7570C
7580C    FORMAT STATEMENTS
7590C
7600 1005 FORMAT(//,16X,12HPAYMENT DATE,30X,A9)
7610 1010 FORMAT(A2)
7620 1020 FORMAT(1X,25X,A45)
7630 1030 FORMAT(1HO,15X,2H15,1X,A3,1X,I2,28X,I12)
7640 1040 FORMAT(1X,15X,5HTOTAL,32X,I12)
7650 1060 FORMAT(37X,A8)
7660 RETURN
7670 END
7680C
7690C  ****  SUBROUTINE PPRINT  ****
7700C
7710 SUBROUTINE PPRINT(HC,HM,IAM,ISFTAB,ISTTAB,KARWID,KFLAG,KIAM,KNCOL
7720& ,LP,MBEG,MEND,MCL,MON1,NCOL,NOL,NOLINE,NSUB,NUM,PCT,PER,MYR1)
7730 CHARACTER HM*45(8),HC*8(42,7)
7740 DIMENSION IAM(43,67),ISFTAB(43),ISTTAB(43,3),NCOL(43,43),NOL(20)
7750& ,PCT(43),PER(43,120)
7760C
7770 PRINT:
7780 IF (LP.GE.3) PRINT:"LEVEL OF PROMPTING:"
7790 PRINT 1010,LP
7800 IF (LP.GE.3) PRINT:"CARRIAGE WIDTH:"
7810 PRINT 1010,KARWID
7820 IF (LP.GE.3) PRINT:"MAIN HEADING:"
7830 DO 10 N=1,NOLINE
7840 PRINT 1020,HM(N)
7850 10 CONTINUE
7860 IF (LP.GE.3) PRINT:"BEGINNING MONTH, BEGINNING YEAR, FIRST"
7870&" DELIVERY AND LAST DELIVERY:"
7880 PRINT 1030,MON1,MYR1,MBEG,MEND
7890 CALL COLIST(HC,IAM,ISFTAB,ISTTAB,KFLAG,KIAM,LP,MON1,MCL,PER,NOL,
7900&NSUB,NUM)
7910 IF (NUM.NE.NSUB-1) GO TO 20
7920 IF (LP.GE.3) PRINT:"THERE ARE NO SURCHARGES."
7930 GO TO 30
7940 20 CONTINUE
7950 DO 40 J=NSUB+1,NUM
7960 IF (LP.GE.3) PRINT:"COLUMN NUMBER AND HEADING:"
7970 PRINT 1040, J,(HC(J,K), K=1,MCL)
7980 IF (LP.GE.3) PRINT:"PERCENTAGE, NUMBER OF COLUMNS, AND COLUMN NUMBERS:"
7990 PRINT 1050, PCT(J),NCOL(KNCOL,J),(NCOL(N,J), N=1,NCOL(KNCOL,J))
8000 40 CONTINUE
```

```
8010 30 CONTINUE
8020C
8030C    FORMAT STATEMENTS
8040C
8050 1010 FORMAT(1X,I3)
8060 1020 FORMAT(1X,A45)
8070 1030 FORMAT(1X,3(I2,1H,),I3)
8080 1040 FORMAT(1X,I2,1H,,7(A8))
8090 1050 FORMAT(1X,F5.2,1H,,I3,1H,,2(20(I3,2H, )/))
8100C
8110 RETURN
8120 END
8130C
8140C  ****  SUBROUTINE COLIST  ****
8150C
8160 SUBROUTINE COLIST(HC,IAM,ISFTAB,ISTTAB,KFLAG,KIAM,LP,MON1,MCL,PER,
8170&NOL,NSUB,NUM)
8180 DIMENSION IAM(43,121),ISFTAB(43),ISTTAB(43,3),PER(43,120),NOL(20)
8190 CHARACTER HC*8(42,7)
8200 IF (KFLAG.EQ.0) K=NUM
8210 IF (KFLAG.EQ.1) K=NSUB-1
8220 DO 30 N=1,K
8230 PRINT:
8240 IF (LP.GE.3) PRINT:"COLUMN NUMBER, SCHEDULE TYPE, AND TOTAL AMOUNT:"
8250 PRINT 1010, N,ISTTAB(N,1),IAM(N,KIAM)
8260 IF (LP.GE.3) PRINT:"COLUMN HEADING:"
8270 PRINT 1020, (HC(N,I), I=1,MCL)
8280 IF (ISTTAB(N,1).NE.0) GO TO 30
8290 IF (LP.GE.3) PRINT:"BEGINNING,END:"
8300 PRINT 1030, ISTTAB(N,2),ISTTAB(N,3)
8310 IF (ISFTAB(N).EQ.1) GO TO 20
8320 IF (LP.GE.3) PRINT:"SPECIAL FACTORS:"
8330 PRINT 1040, (PER(N,I), I=1,NOL(N))
8340 GO TO 30
8350 20 IF (LP.GE.3) PRINT:"STANDARD FACTORS ARE USED."
8360 30 CONTINUE
8370 NSUB=K+1
8380 PRINT 1050,NSUB
8390 PRINT:
8400C
8410C    FORMAT STATEMENTS
8420C
8430 1010 FORMAT(1X,2(I2,1H,),I10)
8440 1020 FORMAT(1X,7(A8))
8450 1030 FORMAT(1X,2(I2,1H,))
8460 1040 FORMAT(1X,12(F5.2,1H,))
8470 1050 FORMAT(1X,19HSUBTOTAL IS COLUMN ,I2)
8480C
8490 RETURN
8500 END
```

```
8510C
8520C   ****  SUBROUTINE CCHECK  ****
8530C
8540C THIS SUBROUTINE CHECKS THE FIRST NVAR VARIABLES
8550C IN THE STRING "LINE" FOR NUMERIC VALUE.  IF YES
8560C MIS=0 ELSE MIS=1.
8570C
8580 SUBROUTINE CCHECK(LINE,MIS,NVAR)
8590 CHARACTER CKN*1(12),LINE*132,ANS*1,ANC*1
8600 DATA CKN/1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9,1H.,1H,/
8610 MIS=0
8620 N1=0
8630 10 N1=N1+1
8640 IF (NVAR.EQ.0) GO TO 30
8650 ANC=ANS
8660 CALL CONCAT(ANS,1,LINE,N1,1)
8670 DECODE (ANS,1) ANS ; 1 FORMAT(A1)
8680 IF (ANS.EQ.1H .AND.ANC.EQ.1H,) GO TO 25
8690 IF (ANS.EQ.1H ) ANS=1H,
8700 IF (ANS.EQ.1H,) NVAR=NVAR-1
8710 DO 20 N=1,12
8720 IF (ANS.EQ.CKN(N)) GO TO 10
8730 20 CONTINUE
8740 25 MIS=1
8750 30 RETURN
8760 END
8770C
8780C  ****  SUBROUTINE ROUND  ****
8790C
8800 SUBROUTINE ROUND (IAM,IRND,KIAM,MSTOP,NMC,S,IST)
8810 DIMENSION IAM(43,121)
8820 INTEGER S(12,2)
8830 N=MSTOP+1
8840 DO 100 I=1,KIAM
8850 N=N-1
8860 IF (IRND.EQ.0) GO TO 20
8870 IF (N.EQ.S(IST,1)) IAM(NMC,N)=IAM(NMC,N)+IRND
8880 IF (N.EQ.S(IST,1)) GO TO 20
8890 IF (IAM(NMC,N).EQ.0) GO TO 100
8900 IAM(NMC,N)=IAM(NMC,N)+IRND
8910 IF (IAM(NMC,N).GE.0) GO TO 20
8920 IRND=(IAM(NMC,N))
8930 IAM(NMC,N)=0
8940 100 CONTINUE
8950 20 RETURN
8960 END
8970 SUBROUTINE BUILD (NRMON, V)
8980C 78 SEP 15 FRI  LAST CHANGE
8990C
9000C  THIS SUBROUTINE BUILDS A TABLE OF VALUES (V) TO BE RETURNED
```

```
9010C  TO THE CALLING PROGRAM.
9020C  THE VALUES ARE A BELL SHAPED CURVE COMPUTED FROM ITS FIRST
9030C  DERIVATIVE.
9040C
9050C  V ARRAY OF VALUES IN OUTPUT TABLE
9060C  NRMON NUMBER OF MONTHS.
9070C  NR ITEMS IN TABLE
9080C  SV  RUNNING  SUM  OF  V
9090C  Y  TABLE DESCRIBING FIRST DERIVATIVE
9100C  T  TIME OR MONTH IN UNITS OF PERCENT OF DERIVATE TABLE TIME
9110C  I  INDEX FOR MONTH
9120C  PV  PREVIOUS VALUE OF V
9130C
9140C
9150   DIMENSION V(NRMON), Y(18)
9160   DATA Y/1.0,1.0,1.0,1.0,1.2,1.6,1.9,2.0,1.7,1.0,0.0,-1.2,
9170  &-2.4,-3.0,-2.6,-1.6,-1.4,-1.0/
9180C
9190   TM=15.0
9200   PV=0.0
9210   SV=0.0
9220   TFAC=(TM+1.0)/FLOAT(NRMON+1)
9230C
9240C  COMPUTE RAW VALUES FOR TABLE
9250   DO 200 I=1,NRMON
9260   T=FLOAT(I)*TFAC+1.0
9270   IT=IFIX(T)
9280   V(I)=PV+Y(IT)+(Y(IT+1)-Y(IT))*(T-FLOAT(IT))
9290   PV=V(I)
9300   SV=SV+V(I)
9310   200 CONTINUE
9320C
9330C  ADJUST VALUES SO TOTAL = 100 %
9340C
9350   VFAC=100.0/SV
9360   DO 400 I=1,NRMON
9370   V(I)=V(I)*VFAC
9380   400 CONTINUE
9390   RETURN
9400   END
9410C
9420C
9430   SUBROUTINE TESTB
9440  DIMENSION IAM(43,121)
9450C  NR OF MONTHS IS ENTERED INTERACTIVELY
9460C  ENTER ZERO TO EXIT TEST PROGRAM
9470   DIMENSION V(120)
9480   100 CONTINUE
9490   PRINT 200
9500   200 FORMAT(" ENTER NR OF MONTHS")
```

```
9510  READ 300,NRMON
9520  300 FORMAT(I3)
9530  IF (NRMON.LT.1) RETURN
9540  CALL BUILD (NRMON,V)
9550  PRINT 400, NRMON
9560  400 FORMAT(///" NRMON=",I4)
9570  CUM=0.0
9580  DO 600 I=1,NRMON
9590  CUM=CUM+V(I)
9600  PRINT 500,I,V(I),CUM
9610  500 FORMAT(I4,2F10.2)
9620  600 CONTINUE
9630  GO TO 100
9640  END
9650C   ***  SUBROUTINE AREA  ***
9660C
9670C Y    ARRAY VALUES TABLES
9680C N    NUMBERS OF ELEMENTS OF THE TABLE Y
9690C TAREA IS THE VALUE OF THE CURVE AREA
9700C
9710  SUBROUTINE AREA
9720  DIMENSION Y(11)
9730  DATA Y/.9,2.0,2.4,2.5,2.1,0.7,-1.3,-2.3,-2.9,-2.8,-1.7/
9740C
9750  N=11
9760  NMONE=N-1
9770  TAREA=(Y(1)+Y(N))/2.0
9780  DO 200 I=2,NMONE
9790  TAREA=TAREA+Y(I)
9800  200 CONTINUE
9810C
9820C THE VALUE OF THE AREA
9830C
9840  PRINT 300, TAREA
9850  300 FORMAT(" THE VALUE OF THE AREA IS: "F5.2)
9860  RETURN
9870  END
```

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